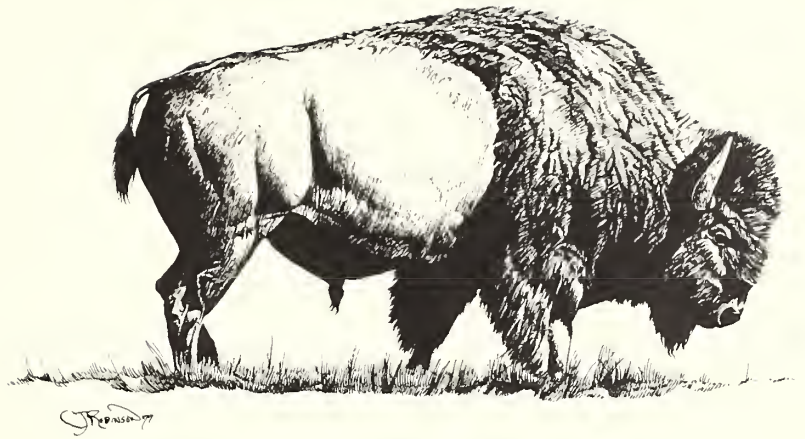


Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve
aE77
.9
.G86



ARCHEOLOGY OF THE HIGH PLAINS

James H. Gunnerson

USDA Forest Service

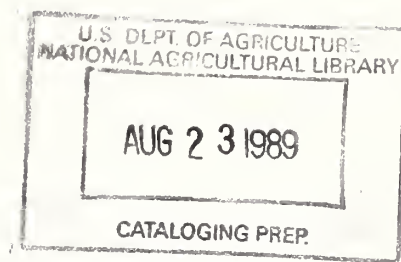
AD-33 Bookplate
(1-63)

NATIONAL

**A
G
R
I
C
U
L
T
U
R
A
L**



LIBRARY



ARCHEOLOGY OF THE HIGH PLAINS

By James H. Gunnerson

**Rocky Mountain Region
USDA Forest Service
Denver, Colorado
1987**

COPIES OF THIS DOCUMENT ARE AVAILABLE FROM:

USDA FOREST SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
11177 WEST 8TH AVENUE
DENVER, COLORADO 80225

OR

USDA FOREST SERVICE
SOUTHWESTERN REGION
517 GOLD AVENUE, S.W.
ALBUQUERQUE, NEW MEXICO 87102

This document is in the public domain and may be quoted. Please credit either the USDA Forest Service, the Bureau of Land Management, and/or the author if any portion of this work is quoted or used.

This document is printed in conjunction with the Pike/San Isabel and Cibola National Forests Land Management Plans. This volume serves as support for the above plans and is an integral part thereof.

DESIGNED BY: LARRY SIMMONS

FOREWORD

This publication presents an overview of the archeology of the Central High Plains. The volume provides baseline information about the archeology of the USDA Forest Service's Regions 2 and 3 and the Bureau of Land Management's Canon City (Colorado) and Albuquerque (New Mexico) Districts. The work describes the archeology of portions of five states and represents a large geographic area ranging from the Continental Divide to the Plains of Kansas and Nebraska.

A major feature of this work is the fact that it is one of the first such projects that was jointly prepared by the Forest Service and the BLM. Because much of the land managed by these two agencies is adjoining or is in the same geographic region, it was logical to create a document that both groups could use. The Forest Service and BLM also agreed that this database should cover two BLM states and two Forest Service regions, again making this project one of the first of its kind.

One of the primary objectives of both the BLM and the Forest Service is to identify and, as needed, preserve significant cultural resources located on public lands. Evidences of our past cover large areas of the National Forest and the public domain. In order to provide for the orderly and careful evaluation of these places, this baseline narrative gives our specialists and our managers information by which to wisely conserve our national cultural heritage.

This volume will provide our managers and the professional community with a study that should become the standard reference for this region. Because of the massive amount of research that went into this work, it is unlikely that it will be duplicated in the near future. Therefore, we are pleased to share this important volume with you and we hope that both the Forest Service and the BLM's contribution to the body of archeology is both long-lasting and useful to the professional reader as well as to the general public.



Regional Forester
USDA Forest Service
Denver, Colorado

TABLE OF CONTENTS

	Page
Forward	i
Introduction	ii
Acknowledgements	iii
Prologue	1
Chapter I The PaleoIndian Period	7
Chapter II The Archaic Period	26
Chapter III The Early Ceramic Period	41
Chapter IV The Middle Ceramic Period	65
Chapter V The Late Ceramic Period	97
Chapter VI The Historic Period	113
Chapter VII Cultural Summary of the High Plains	117
References Cited	139
Photo Folio	64
Appendix I	261
About the Author	303

INTRODUCTION

In 1982, the U.S. Forest Service and the Bureau of Land Management (BLM) contracted with Professor James H. Gunnerson to write an overview of a large area defined as the Central High Plains, a region encompassing eastern Colorado, northeastern New Mexico, western Kansas, western Nebraska, the Texas panhandle, and parts of Oklahoma. The purpose of this study was to provide a baseline narrative for the prehistory in this region in order to enable land managing agencies like the Forest Service and the BLM to understand the extent of prehistoric resources that might be present on these federal lands. The reason for this interest lies in the mandates of various federal legislation requiring agencies to consider cultural values on their lands prior to actions that might destroy these valuable resources.

In order to provide a “starting point” for the consideration of archeologic values, existing data needed to be gathered, synthesized, and then analyzed to provide a foundation from which cultural resources could be managed by the Forest Service and the BLM. To this end, Professor Gunnerson gathered all known literature pertaining to the archeology of this region; he looked at thousands of individual site forms, and he compiled a detailed bibliography for the Central High Plains. This has resulted in a rather massive volume that is probably the most comprehensive look at the archeology of this area ever produced.

In addition to a complete view of archeology, Professor Gunnerson, along with his wife Dolores, prepared a companion ethnohistory of the plains that provides the connection between prehistoric peoples and the coming of European settlement. The ethnohistory portion of this project will be published as a separate volume. Between the archeology and ethnohistory of the high plains, we now have a comprehensive view of some 10,000 years of human occupation.

Included in Professor Gunnerson’s study are not only descriptions of archeological work that has been done over the year, but also, in a detailed evolutionary system, he displays the various phases of human use of this land.

Included in this study are illustrations of point types, several maps of the region and a truly com-

prehensive bibliography that is general on the one hand and specific to the various states on the other. The U.S. Forest Service and the BLM are pleased to have been able to assist in the preparation of a monumental study of this nature, and we trust that it will remain the standard for high plains archeology for years to come. Thanks to Professor Gunnerson’s exhaustive research, and his dedicated efforts, this work should stand alone in the field of plains archeology for decades. A partnership such as this between the academic community and the Federal Government has proven that documents that are mutually useful can be produced.

In addition, the general public will find Dr. Gunnerson’s work most enjoyable reading. With so many uses, a work such as Jim Gunnerson’s will find its way onto library shelves throughout the nation, and we hope that those who choose to read it will do so with the knowledge that this work was prepared for us all.

Frederic J. Athearn
Bureau of Land Management
J. Steve Sigstad
U.S. Forest Service
Denver, Colorado
1986

ACKNOWLEDGEMENTS

While preparing this overview of high plains archeology, I benefited from the assistance of numerous individuals representing a variety of institutions.

In an attempt to get the feeling for current activities in the five states involved, personal visits were made to many research organizations and information was solicited from others by mail.

In a number of institutions more than one division, such as academic departments, museums, or offices of contract archeology, were visited.

Individuals first consulted often kindly queried colleagues on behalf of the project until the list of those who contributed valuable data became unwieldy. Therefore, with few exceptions, specific thanks are limited to institutions.

COLORADO

University of Colorado, Boulder
Colorado State University, Fort Collins
Northern Colorado University, Greeley
University of Southern Colorado, Pueblo
University of Denver
Colorado College, Colorado Springs
Adams State College, Alamosa
Trinidad Junior College, Trinidad
Otero Junior College, La Junta
Colorado Historical Society, Denver
Denver Museum of Natural History

KANSAS

University of Kansas, Lawrence
Kansas State University, Manhattan
Wichita State University, Wichita
Kansas State Historical Society, Topeka
Santa Fe Trail Center Museum, Larned
Kansas Anthropological Association

NEBRASKA

University of Nebraska, Lincoln
Nebraska State Historical Society

NEW MEXICO

University of New Mexico, Albuquerque
New Mexico State University, Las Cruces
Museum of New Mexico, Santa Fe
Quivira Research Center, Albuquerque
Seton Museum, Philmont Scout Ranch, Cimarron

OKLAHOMA

University of Oklahoma, Norman
Oklahoma Historical Society

TEXAS

University of Texas, Austin
West Texas University, Canyon
Texas Tech University, Lubbock
Panhandle-Plains Museum, Canyon
Texas Historical Commission

U.S. GOVERNMENTAL AGENCIES

U.S. National Museum, Smithsonian Institution, Washington, D.C.
Midwest Archaeological Center, National Park Service, Lincoln
Southwest Cultural Resources Center, National Park Service, Albuquerque
Denver Service Center, Archeological Assistance Division, National Park Service, Denver
Denver Service Center, Bureau of Land Management, Denver
Bureau of Reclamation, Denver
Rocky Mountain Region, U.S. Forest Service, Denver

This document is the end product of a project sponsored by the U.S. Forest Service and the Bureau of Land Management. It was conceived and steered by a dedicated committee made up of Dr. Steve Sigstad, Chair (USFS), Dr. Frederic J. Athearn (BLM), Ms. Chris Kincade (BLM), Mr. Dan Martin (BLM) and Mr. Joe Tainter. Cynthia Bowsman served as research assistant for nearly a year and, in addition to typing the first draft, did a substantial portion of the bibliographical compilation and part of the literature search. Gail Littrell typed the final draft of the manuscript on a word processor and carefully read proof on that draft. Maps and figures were drafted by Marty Haack, Mark Marcuson and Leigh Wellborn (BLM). Dr. Dolores Gunnerson contributed information on the protohistoric and historic periods and edited two drafts of the manuscript.

Although these institutions and individuals have contributed immeasurably to this work, the shortcomings of the interpretations (that may well need to be modified later) are solely my responsibility.

James H. Gunnerson
March, 1986

PROLOGUE

This volume presents a synthesis or overview of the archeology of the Central High Plains. The area is bounded on the north by 41 latitude, on the east by the 99th meridian, on the south by 35 latitude in New Mexico, Texas and Oklahoma and by 37 latitude in Colorado, on the west by the Continental Divide in Colorado and by the eastern foothills of the Sangre de Cristo Mountains in New Mexico. Since relatively little archeology has been done in this area, and most of that on the perimeters, it has been necessary to draw upon work done just beyond the borders to round out a synthesis, and even so, the treatment of complexes and periods is uneven. In some cases, enough information is available for a general summary of a complex. In other instances, where a complex is represented by limited work at perhaps only one site, a detailed description of material recovered is given to provide comparative data should future workers find similar material. Detailed descriptions of diagnostic artifacts, primarily projectile points and pottery, are included in Appendices and are often copied in their entirety. Although the bibliography is not exhaustive, it is extensive, containing many potentially useful items not cited. In some cases entire bibliographies from other works, including annotations, have been reproduced, with credit: references cited are so identified, although not all of the cited references were personally examined (*e.g.*, when they were included in reproduced tables). The major gap in the bibliography is the absence of reports of contract archeology that were prepared in limited numbers and deposited only with appropriate agencies. An effort should be made to compile and publish a list of such reports.

Some interpretations of cultural relationships, especially as implied in the correlation chart (Fig. 2), are speculative and will not meet with universal agreement. Most of the interpretations, however, are testable if additional work is done. This volume can be considered only a first approximation of a synthesis of a poorly known 400,000 square kilometer area through some 15,000 years. Hopefully, it will serve as a point of departure for further refinements.

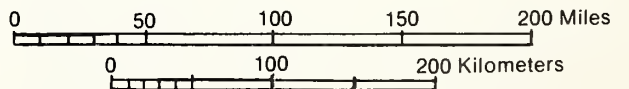
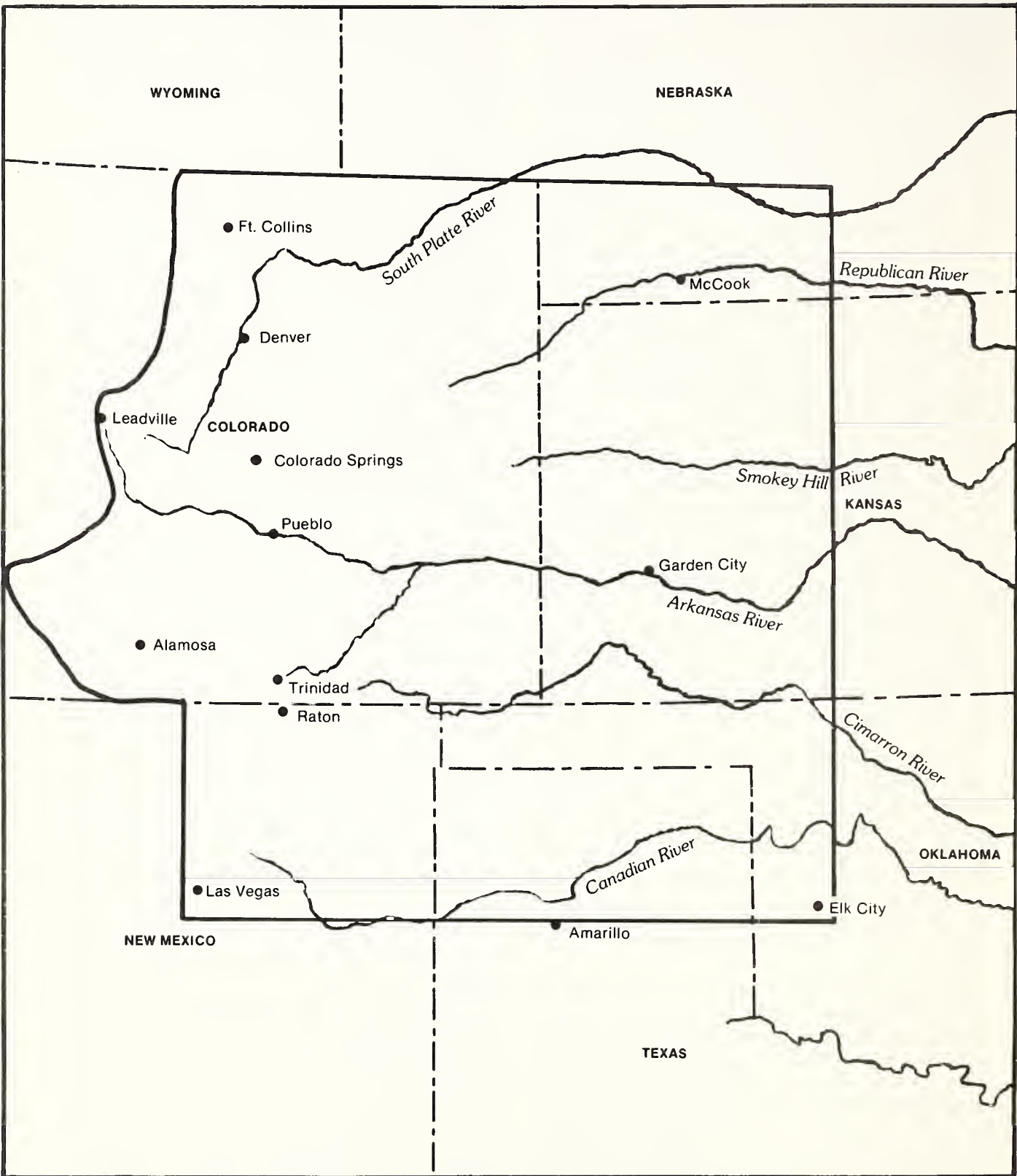
The Central Great Plains have been occupied for at least 11,500 years and possibly much longer. During this time, the area experienced radical changes in climate that resulted in marked changes not only in the flora and fauna but, to some extent, in the topography. Even after the end of glacial times and the extinction of various Pleistocene species, there were droughts of great magnitude. The plains have seen as much environmental fluctuation as any part of North America and more than most. The marginal nature of the plains, dictated by the rain shadow of the Rocky Mountains, is reflected in the archeological record. This synthesis of the prehistory of the Central High Plains presents a picture of cultural continuity with variations in response to

changing environment and diffusion of traits from neighboring areas; migration apparently played a lesser role. Although various phases in the continuum can be viewed as climactic, nowhere in the archeological record do we find cultural climaxes comparable to those in Mesoamerica, the American Southwest, the Mississippi valley, or the Northwest Coast. At best, life on the Central High Plains has been precarious.

Archeological work in the plains has been going on for nearly a century and Europeans have observed Indian life there for nearly four and a half centuries. Systematic professional archeology, however, is only about a half century old and there are still many, many gaps in the archeological record. Some of these will probably never be filled since the area is large, archeologists few and financial support limited. Also, archeological remains are being destroyed at an alarming rate. Much of the field work done in the past has never been adequately reported and in some cases is not represented in the literature at all. This is especially true for work done in the late 1930's under various federally funded "relief" projects, for salvage work done in the late 1940's and 1950's ahead of the construction of major federally funded dams, and for work done by university-sponsored archeological field schools. Fortunately, most of the collections and field notes, some of them very good, have been preserved. Collections and related data that have been reported in print are, for the most part, available for restudy in the light of more recent research and analytical methods, and such reanalysis and reinterpretation is going on, if slowly. Because of the broad scope of the present overview, however, it is based almost entirely on information available in the literature, uneven as it is.

Often, the results of a single survey do not provide enough data to serve as the basis for a meaningful published synthesis although more and more research is being designed to obtain significant results with very limited data; included are questions of resource utilization, ecological concerns, stone working technology, etc., and computerization of data from numerous surveys is making other kinds of research feasible. Whereas once it would have been too time-consuming to glean particular kinds of data from the survey files or even determine if the data were available, it is now becoming possible to quickly retrieve, or at least locate, data in particular categories. Where statistical manipulation is needed, it can often be achieved at the same time by means of an appropriate computer program. One must be cautious, of course, since there are always possibilities of erroneous computer entries, and seldom if ever is all the data desirable for a particular research project available for programming.

Much of the archeological literature consists of reports of excavations at sites chosen for their richness or because they were apparently stratified --



CENTRAL HIGH PLAINS

choices warranted by promise for substantially increasing our knowledge concerning the cultural content of a particular phase or providing the basis for the chronological ordering of phases in a particular region. Before World War II, the published results of regional surveys, such as those carried out and reported by E.B. Renaud of the University of Denver (Downing 1981) in the 1930's, were rare. Renaud provided at least minimal information on all sites found, even where there was very little cultural material present. Fortunately, the information and artifacts obtained during systematic surveys were usually preserved, especially when they were sponsored by some institution such as a museum or university, although provenience sometimes became confused with the passage of time. Early surveys concentrated on areas where sites were expected to be, and incorporated information from local people, such as collectors, farmers and ranchers. In recent years, with the emphasis on historic preservation and the salvaging of archeological material prior to projects that would damage sites, surveys are being carried out even in areas of little promise. The results of such surveys and the reports of mitigation activities at threatened sites frequently do not receive wide distribution. The same can be said of surveys, often employing only random sampling, now being conducted on federally owned lands by the agency responsible for the management of the lands. Thus a large corpus of the archeological data being amassed is still under utilized.

The problem of defining archeological units is complicated by changes in taxonomic systems over the years and differences between systems used in different areas. In the 1930's and 1940's, the McKern or Midwest Taxonomic System was commonly employed in the classification of archeological sites, or rather, the classification of components found at sites. A component was defined as the manifestation at a single site of its use by people having a particular cultural affiliation. Components with essentially identical cultural traits were assigned to a particular *focus*, and *foci* with a high degree of cultural similarity were assigned to a particular *aspect* (Bell 1936: 6-8). More inclusive taxa were the *phase* and *basic culture*. This system had the shortcoming of not including geographical or temporal dimensions, although often these were discussed when a focus or an aspect was defined. At one time the term *culture* was used for a taxonomic unit that could be equated with *focus* or *aspect*, but in the Midwest Taxonomic System, basic culture was the most inclusive taxon. Two other terms commonly used, although not strictly taxonomic, that are commonly used are *complex* and *assemblage*. *Complex* is applied to a group of cultural traits, usually artifact types, that recur together. *Assemblage* is sometimes used in the same way, but is also used for the group of traits found in a component. Complexes, especially, are

frequently named as though they were taxonomic units.

In recent years archeologists working in the plains have come more and more to apply the terminology proposed by Willey and Phillips (1958). Their basic unit is the *phase* which is on the same order of magnitude as *focus* or *aspect*; more restricted units are called *subphases*. Phases and subphases are defined in terms of cultural content, temporal span, and geographical distribution. One is tempted to simply substitute the term phase for focus or aspect in cases where the units were defined in the Midwestern Taxonomic System. The two concepts are sufficiently different, however, that this can not be done. Hopefully, all of Plains archeology will eventually be ordered in terms of the Willey and Phillips system, but to do so will require a reexamination of the artifacts and other relevant basic data. For many units, whether they be called foci, aspects or phases, the information available is still inadequate for precise definitions. For the most part, the terminology used in the literature cited will be retained in this overview.

Within the Willey and Phillips scheme, the sequence of phases is established both locally and regionally as initial steps in cultural-historical integration. For broader integration, two additional units are employed: *horizons* integrate approximately contemporaneous phases within a region and *traditions* reflect cultural continuity from phase to phase through time. Willey and Phillips interpret New World prehistory in terms of five stages, essentially evolutionary or developmental: Lithic, Archaic, Formative, Classic, and Post-classic. For plains archeology only the first three of these stages are applicable, although, as will be seen in the present overview, temporal subdivisions within the stages can be identified. Some of these subdivisions of periods could perhaps be defined in terms of horizons, as Willey and Phillips define them, but such terminology has not come into common use. *Horizon markers* in the Plains, with few exceptions, tend to have such long temporal spans that they really do not fit the criteria.

The tradition concept has been employed sparingly to indicate an integrating unit, but not as precisely as Willey and Phillips visualized its being used. The Plains Village Tradition has been the one most commonly referred to, but it has been applied so broadly that nearly all Formative phases in the Plains would be encompassed, including some phases, or at least components, that are not known to have included villages. Thus, there is not yet, and may never be, clear distinctions in the plains between stages, periods, horizons and even traditions. An important step toward cultural historical integration in the plains will come with the definition of phases into which the results of previous research can be fitted. Given the apparently sudden and perhaps frequent shifts in centers of gravity of the

plains populations, it will be crucial to develop a precise chronological framework that is not dependent on culture content.

In this synthesis, an interpretation of the culture history of the Central High Plains will be presented in terms of eight archeological periods plus a review of the ethnohistory of the area. There are no sharp temporal boundaries between these periods since they grade into one another. (In general, however, the more recent the period, the more precise the dating.) Also, the changes that mark the transition from one period to the next did not necessarily take place at the same time in all parts of the area. Both of these concerns are aggravated by the imprecision of the dating methods that have been used and the very uneven nature of the information available.

The earliest period, called "Paleoindian," starts at least 11,500 years ago (9500 BC) and lasts until roughly 6,000 BC. It is a period characterized by the hunting of large mammals, some of them now extinct, with spears and/or darts propelled by atlatls. The mammoth was characteristic of the early part of the period, followed by bison antiquus which gradually evolved into modern bison bison. During this period of at least 3500 years, changes took place in the design of the projectile points and complexes are distinguished on the basis of these differences. Through time there was an ever increasing diversity of point types and hence of named complexes.

The second major period is called the "Archaic," with three subperiods often identifiable. The beginning of the Archaic period is marked by a climate both hotter and dryer than either before or after. This condition, called the "Altithermal," lasted through the Early Archaic period. Also, starting with the Early Archaic, only modern species of animals were present although their geographical range shifted from time to time. Where it is possible to subdivide the Archaic period, the temporal boundaries are roughly as follows: Early Archaic from 6000 to 3000 BC, the Middle Archaic from 3000 to 500 BC and the Late Archaic from 500 BC to AD 500. During the entire Archaic period there continued to be a heavy dependence on hunting with spears or darts, but with the utilization of a greater variety of animals and a heavier dependence upon the gathering of plants. The entire Archaic period saw a continuing diversification of identifiable cultural complexes which often graded into one another. Projectile points continued to be the index artifacts for these complexes. During this period there is evidence of diffusion of traits, or even migration of people into the Central High Plains from essentially all directions. Archaic complexes tended to become more restricted in both temporal and geographical distribution through time.

The "Early Ceramic" period has as its hallmark the presence, for the first time, of pottery, and can be dated at approximately 500 BC to AD 900. Incipient horticulture has been implied for some of the Early

Ceramic complexes and evidence of simple structures have been found at some of the sites. Hunting and gathering continued to provide the major part of the diet and, except for the pottery, the artifact inventory did not differ markedly from that of the Late Archaic. Toward the end of the Early Ceramic period, smaller delicate projectile points suggest the introduction of the bow and arrow. Early Ceramic complexes throughout much of the Central High Plains appear to reflect influences coming from the east. In only the southwest corner do the changes appear to reflect innovations from the Pueblo Southwest.

The "Middle Ceramic" period, approximately AD 900 to AD 1500, was a time of culture climax throughout much of the plains. The people adopted the cultivation of corn, beans and squash, built substantial earth lodges, made more varied pottery, and hunted primarily with the bow and arrow. Hunting, along with gathering, still provided a substantial part of the diet. Most of the cultural changes, along with the appearance of a new race of corn, probably came from the Southwest although some ideas for pottery decoration and some new religious beliefs appear to have Southeastern origins. The population itself, probably Caddoan-speaking, may have been unchanged since at least Archaic times. During the Middle Ceramic period there was apparently a substantial growth in population in the eastern portion of the Central High Plains, as well as in the prairies farther east. The dependence on Cultivation of plants in this environmentally-marginal area, however, made the people of this period vulnerable to local climatic fluctuations, especially in rainfall. This resulted in shifting populations and, in the mid 1400's, the depopulation of essentially the entire Central High Plains.

The "Late Ceramic" period, also called the "Protohistoric" period, started about AD 1500. With the return of moister conditions, grass on the high plains again became lush and the bison abundant. Before the former inhabitants, almost certainly Caddoan speakers, could reoccupy the area, the Athabaskan-speaking Apaches moved south from Canada and dominated the Central High Plains until about 1720. Not only were the Apaches skilled hunters, even without the horse, they were also adaptable enough to adopt limited horticulture, pottery making, and semipermanent settlements from their sedentary neighbors. The forcing of the Apaches from the high plains in about 1730 by Comanches from the west and Pawnees with French allies and guns from the east essentially marked the end of the Late Ceramic period. Soon after this the cultures of the sedentary tribes on the eastern margin of the Central High Plains started disintegrating under white influence, and especially new diseases, from the east. Throughout the two centuries of the Late Ceramic Period, limited information about the Indians can be gleaned from

accounts by literate European observers. From the middle of the 1700's on, there is sufficient documentary information available that it can be considered the : "Historic Period." This was a time of rapid change leading to continued population decline and the disintegration of aboriginal cultures. The Comanche domination of the Central High Plains, especially near the mountains, lasted until approximately 1800 when there was a rapid and substantial influx of Arapahoes, Cheyennes, Kiowas and Kiowa Apaches from the upper Missouri River area. The Comanche responded by moving the center of their activities to northwestern Texas and were soon followed by the Kiowa and Kiowa Apache. Other tribes, such as the Crow, Blackfeet and Dakota Sioux, soon made their appearance when the colorful but short-lived horse-nomad, bison-hunting, pan-tribal plains culture was at its peak. The Pawnee and Wichita, plus various tribes from the eastern edge of the plains, many of whom had been recently put on reservations there, continued to hunt on the high plains. During the 1860's, the flamboyant Plains lifestyle came to an abrupt end and soon all of the Plains tribes were on reservations. Culture history after the mid-1800's is beyond the scope of this volume.

Environment

The environment of the Central High Plains is characterized by low precipitation and seasonal extremes of temperature. In the past 12,000 years, there have been periods of severe drought affecting all or portions of the area. Periods of markedly lower average temperatures and higher precipitation than present appear to have been less common and to have had less effect on the populations. To a very large extent, the climate is determined by the flow of air from the west and the effect on air flow of the Rocky Mountains at the western edge of the plains. The relatively low rainfall supports only short grass over most of the area, with trees restricted to the water courses. As one gets into the foothills, small evergreens and scrub become common, with substantial stands of large conifers at higher elevations.

Elevation at the eastern edge of the Central High Plains, arbitrarily defined as the 99th meridian, is quite consistently at about 600 m. The Plains slope gently up to the west, with elevations varying from 1,500 to about 2,100 m at the Rocky Mountain foothills. The only major break in this gently sloping plain is the series of connected mesas extending east from the mountains along the New Mexico-Colorado border to the northeastern corner of New Mexico. The northern portion of the Central High Plains is drained by the Platte and Republican Rivers, the central part by the Arkansas River and the southern part by the Dry Cimarron and Canadian Rivers. The extreme southwest corner is drained by the Rio Grande and the Pecos River, which

ultimately joins the Rio Grande. All these major rivers except for the Republican head in the mountains and would rarely have gone completely dry. Between the major rivers, water is scarce except for occasional springs, a few of which are very good and dependable, and playas which hold water only in rainy seasons. Except at the height of drought periods, travelers who knew the plains could cross the area in any direction without serious supply problems. Presumably routes feasible under various conditions were well known to the aborigines, and were adopted by European colonists and explorers. Some are reflected in the pattern of modern highways and rail routes.

In good years, the grass on the high plains was abundant and supported large herds of buffalo and a wide variety of smaller animals. Other wild plant foods usable by humans, however, were far less abundant and except for the northeast, southeast and southwest corners of what is here called the Central High Plains, the climate did not permit the growing of corn or other crops, even when the climate was optimum. And in the southwest corner, horticulture would have been precarious without specialized techniques such as irrigation. Throughout the entire area, wherever horticulture was practiced, it was apparently restricted to bottom lands along streams. Since, except in the mountains, trees and permanent water were also restricted to water courses, permanent and semipermanent settlement was also found only near streams.

Detailed descriptions of local environment and available resources can be found in various of the references cited in the bibliography. Especially helpful is *Climate and Man*, the 1941 Yearbook of Agriculture published by the U.S. Department of Agriculture and the *Atlas of American Agriculture, Physical Basis* published in 1936, also by the U.S. Department of Agriculture. The Department of Agriculture has published Soil Surveys for many of the counties in the Central High Plains and these discuss the local environments. The published records of the Weather Bureau provide local information on temperature, precipitation, growing seasons, etc. for numerous stations all over the United States. Most states have Biological Surveys which publish lists of plants and animals found in various parts of the state.

CHAPTER ONE

THE PALEOINDIAN PERIOD

The date of the first peopling of the plains, as of the New World, is still an open question. Although the Clovis complex, with a number of sites dated at 9000 to 9500 B.C., is the earliest well-dated, identifiable lithic assemblage, there is abundant evidence that suggests substantially earlier occupation. The early dates attributed to the Sandia lithic complex, found just to the southwest of the Central High Plains (Hibben 1941; Wormington 1957: 85-91) have been consistently questioned, and thus far, other lithic sites that show evidence of being earlier than about 9500 B.C. (11,500 B.P.) have not yielded distinctive diagnostic artifacts. The question of pre-Clovis (pre-Llano) cultures in the Americas has recently been considered in a volume edited by Humphrey and Stanford (1979). Most archeologists are now in agreement that man has probably been in the New World for at least 20,000 years and perhaps as long as 60,000 years. Evidence for a pre-Clovis occupation in the Central High Plains will be presented later as will a discussion of possible origins for the Clovis complex with its distinctive fluted dart points.

It is highly probable that the Clovis culture, specifically its stone-working technology, is ancestral to all later Paleoindian cultures, with regional traditions evolving. Although our most reliable dates for the Clovis complex come from the plains, similar fluted points have a much wider distribution and it is possible that fluted points were used elsewhere in North America earlier than in the plains. By Middle Paleoindian times, there are distinguishable, but apparently contemporaneous, complexes in the northern and southern plains, with a "boundary" between them somewhere in northern Colorado. By Late Paleoindian times, there seem to be eastern and western traditions meeting in eastern Colorado. Their differences may well be related to environment since they seem to continue on into historic times.

During the Paleoindian period, various species of mammals, especially large ones, became extinct. In a general way, cultural changes coincided with faunal changes: e.g., the only diagnostic stone points found with the remains of mammoth are Clovis points. By the end of the Paleoindian period, which is the beginning of the Archaic period, only the remains of modern animals are found. Paleoindian complexes in general indicate a subsistence pattern based heavily on hunting large animals with darts propelled by

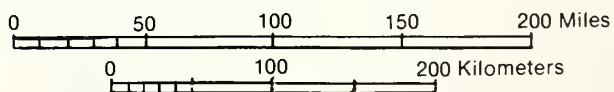
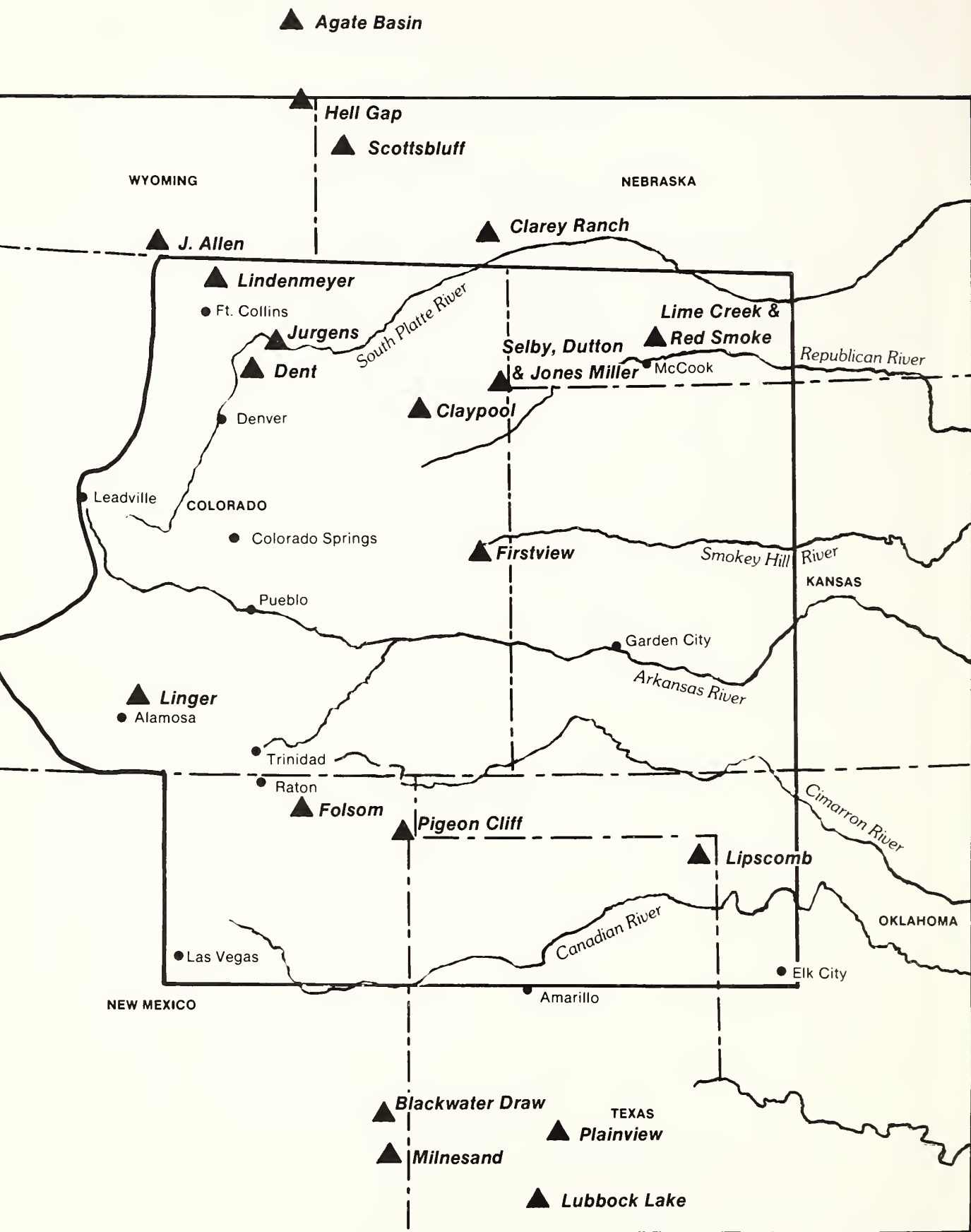
spear throwers (atlatls), or with spears that were thrust. At Paleoindian habitation or camp sites, as opposed to the much more common kill or butchering sites, there is evidence that various smaller animals were also eaten, along with wild plant foods. Lifeway was highly nomadic, with structures very simple and apparently uncommon. Both camp and kill sites show evidence of being reoccupied intermittently. Artifacts chipped from stone that can be identified as to origin indicate travel, or perhaps trade, over distances of several hundred miles.

Although Paleoindian research continues to attract the attention of archeologists and the public, there are many gaps in the data. From time to time, excellent summaries of Paleoindian cultures are written (e.g., Wormington 1957; Frison 1978) which synthesize existing information, point out the need for additional research, and indicate the direction it should take.

Pre-Clovis Complexes

The best evidence for pre-Clovis occupation of the Central High plains, which is also some of the best for North America, comes from the Selby and Dutton sites near Wray, in Yuma County, northeastern Colorado (Stanford 1979). These two sites, 27 km apart, are very much alike and could well be representative of numerous similar, but as yet undetected, sites in the Central High plains. Both Selby and Dutton were discovered in the course of deepening two "playas", shallow depressions which sometimes hold water and are commonly called "buffalo wallows." There are thousands of such depressions aligned either with structural joints in the underlying Ogallala formation or with parts of shallow, ponded, arroyo systems. The depressions are into Peorian Loess which is overlain by Holocene soils. The upper boundary of the Peorian Loess in Yuma County, Colorado, could be as old as 29,000 B.P. (Stanford 1979: 105, following Ruhe 1976). At both the Selby and Dutton sites, at least one bone level was found well within the Peorian Loess; in each case the faunal remains contained in the lower levels included horse, camel, bison, and various small mammals, but no mammoth. At the Selby site, a camel metapodial chopper was found in the Peorian Loess, and evidence of butchering was noted on bones from the loess at both sites.

A limonite band marks the transition from the



▲ SELECTED PALEOINDIAN SITES

Peorian Loess to the lowest unit in the fill of the depressions. The fill itself consists of lacustrine deposits made up of interbedded sands, and blocky clays occur in discontinuous lenses. At both sites, the lacustrine deposits contain bones of mammoth, horse, camel, bison, sloth, peccary, deer, antelope, and various small mammals. Most of the bone tools and flaked bones came from the lacustrine deposits. No radiocarbon dates are yet available for the lacustrine deposits, but Stanford (1979: 102) suggests a possible age in excess of 15,000 years.

The contact between the lacustrine deposits and the overlying gleysol is marked by an irregular "flame structure" characteristic of such contacts. Most of the gleysol deposit had been removed by construction work at the Dutton site, but at Selby it contained poorly preserved mammoth bone and evidence of a Clovis occupation. Radiocarbon dates on mammoth bone collagen from this level are $11,710 \pm 150$ years B.P. and 7880 ± 500 years B.P. (samples SI-2877 and SI-3541). Above the gleysol Clovis level is a dark gray Holocene soil devoid of bones and artifacts.

Except for a scraper at the bottom of a rodent run at the Dutton site, there were no stone tools in the lacustrine (pre-Clovis) level; however, seven tiny impact flakes were recovered during screen washing. It was impossible to determine whether the scraper had fallen down the rodent run or whether it was indeed in situ in the lower level, and the rodent turned laterally when it was encountered. A constellation of other traits, however, leads one to the conclusion that the evidence in the lacustrine level does represent human activity even though each of the bits of evidence alone could be accounted for in some other way (each in a different way). The evidence (Stanford 1979: 108) is as follows:

1. The presence of apparent 'expediency tools' made of bone.
2. The presence of flaked bone.
3. The presence of bone apparently processed for the removal of marrow.
4. The presence of stone artifacts.

Bone expediency tools, used for butchering and hide working, have a sharp edge produced by means of a spiral fracture. They show tiny step fractures, polish and striations. Four choppers, two made from bison tibiae and two from horse tibiae, were found in the lacustrine unit at the Dutton site. All were made "to a pattern," i.e., from distal ends, with the proximal ends of the spiral fractures terminating on the posterior side of the bone. Polish occurs on the ridges and especially on the exterior margins of the spiral fracture where step fractures are also noted. At Selby, two nearly identical choppers made from the distal ends of camel metapodials were found, one in the lacustrine unit and the other in the underlying Peorian Loess. Edge damage and polish are evident on the proximal end of the spiral fracture. A split mammoth rib shows high polish but

only on one end. The proximal end of a bison radius shows a spiral fracture with heavy step fracture and polish on the broken end. Several other bone fragments showed step fracture and polish, presumably from being used as scraping tools.

Flaked mammoth long bone was found in the lacustrine units of both sites. Cores, produced by means of spiral fractures, had striking platforms prepared by repeated crushing blows. When striking platforms were properly prepared, long flakes were removed. Linear striations, presumably resulting from the removal of the periosteum to facilitate flaking, are often observable. Some of the bone flakes, from 4 to 16 cm long, show use-damaged and polished edges, while others show no wear and are considered debitage.

Impact fractures, often multiple, on long bones of camel, horse, bison, and mammoth are interpreted as resulting from preliminaries to marrow removal.

The seven tiny flakes from the lacustrine unit at the Dutton site could be intrusive; they were found during screening, so their exact provenance is not known. The flakes, however, are sharply in contrast to the rounded gravel in the deposit, and some had been heat treated. They were probably detached from a chopping tool during use.

Carnivores can and do break and gnaw bones, and bones can be broken and polished through trampling by animals. It seems likely, however, that the probable bone tools from the Selby and Dutton sites were indeed man-made; the breaking and polishing is patterned, not random. Only certain bones (e.g., metapodials, tibiae, etc.) were broken and polished, and those only in particular ways. A personal examination of several of these specimens left no doubt in my mind that they were human artifacts, deliberately fashioned and used. Stanford (1979: 119) also points out that some of these bone tools are analogous to ones from younger sites such as the Jones-Miller site (Stanford 1974), the Casper site (Frison 1974), and the Lubbock Lake site (Johnson 1978), all on the high plains. Similarly modified camel metapodials were also found in the pre-Cody level at the Lamb Spring site, just southwest of Denver, Colorado, which is dated around 13,000 B.P. Also, according to Stanford, bone flakes from the Dutton and Selby sites resemble bone flakes at the Old Crow site in the Yukon (Bonnichsen 1978, 1979; Harrington, Bonnichsen, and Morlan 1975; Morlan 1976, 1978; Irving 1971, 1978). Old Crow is probably comparable in age to Dutton and Selby. The fact that the Lamb Spring site (5 DA 83) produced bones of Columbian mammoth, camel, horse, and bison suggests a pre-Clovis occupation there. Also from this site came Eden-Scottsbluff artifacts dated at about 8000 years ago (discussed as part of the Cody complex), but Eden-Scottsbluff is much too late for the Lamb Spring faunal assemblage. Stanford has recently returned to carry out additional work at Lamb Spring.

Just to the southeast of the Central High Plains, in Kiowa County, Oklahoma, is another possible pre-Clovis site. At the Coopertown site, the skeleton of a young mammoth was found with bones broken as though by human activity. No diagnostic artifacts were found but several rocks were associated that might have served as hammerstones and an anvil. The site was dated at 17,000 to 21,000 years ago (Gilbert 1979: 23; Adrian Anderson 1975).

Clovis Complex

The earliest recognized Paleoindian complex in the plains that contains diagnostic stone artifacts is the Clovis complex. A few sites to the south and west have yielded Sandia points, which may be earlier, but no Sandia points have been found under controlled conditions in the Central High plains (Wormington 1957: 85-91) and the possibility of misidentifying points as Sandia is great. Clovis points and/or very similar fluted points, sometimes associated with the remains of mammoth, have been found over much of the eastern two-thirds of the United States.

Most excavatable sites identified as Clovis are kill sites where the distinctive large, fluted dart points have been found with mammoth skeletal remains. Some mammoth kill and/or butchering sites without the distinctive points have also been tentatively assigned to Clovis. Often, Clovis sites are at the edge of what then would have been shallow lakes or marshy areas, presumably where mired-down mammoths could have been more easily killed. Where dated, Clovis sites fall in a short period from 9000 to 9500 B.C. Geologic evidence indicates that the plains were much wetter at that time (Wormington 1957: 43-59).

A list of Clovis sites from all over the United States, along with radiocarbon dates, was prepared by Haynes (1970: 79) and is reproduced in table 1.

The Blackwater Draw Locality # 1, the type site for the Clovis complex, is located between the towns of Clovis and Portales in about the middle of the extreme eastern edge of New Mexico, about 150 km south of the southern edge of the Central High Plains. Work in Blackwater Draw started in 1932 and has been continued by various institutions ever since (Howard 1935a, 1935b; Cotter 1937a, 1938; Sellards 1952). In 1936 and 1937, Cotter found two fluted points, in unquestionable association with mammoth remains, which became the type specimens for Clovis fluted points. At the same time, two tapering bone cylinders, 7.5 to 10 cm long, with beveled ends were also found; these are most probably bone projectile points. Later stratigraphic studies were undertaken in the area by Evans (1951) who determined that the Clovis material was in the lowest cultural level, which in turn rested on a sterile gravel layer. Above the Clovis level, with its mammoth bones, was a level producing bison bones and

Folsom points (Sellards 1952; Wormington 1957: 49-50). Still higher stratigraphically were artifacts that provided the basis for what Sellards (1952) called the Portales complex and is here discussed with the Firstview complex. In contrast to the very dry conditions that now exist in the Blackwater Draw vicinity, during Clovis times the area was a lake or marsh, indicating a generally pluvial period.

In addition to the distinctive fluted dart points, the Clovis tool kit included: "end scrapers, commonly spurred; large unifacial side scrapers; keeled scrapers on large blades; flake knives; some backed [dulled on one edge], worked blades, graters, and perforators; bone points; foreshafts; and shaft straighteners" (Haynes 1970, 1981). Hester (1966: 130) lists the following specimens, found in the Clovis complex at Blackwater Draw: Clovis points, flakes, blades (struck from cores), side scrapers, end scrapers, graters, unifacial knives, bifacial knives, flake scrapers, flake knives, hollow edge scrapers ("spokeshaves"), scraper-graters, scrapers, end-and-side scrapers, choppers, cores, hammerstones, channel flakes, burins, grinding stones, bone artifacts, Enterline side scrapers, projectile point blanks, and paint stones.

There is still a debate as to whether Clovis culture developed in North America from some previous, unspecialized complex or, as Haynes (1970) believes, had its roots in a Siberian complex that spread rapidly across North America once there was free passage from Alaska through glacial ice, possibly during the Two Creeks glacial retreat. Hester, too (1966), makes a good case for the origin of the Clovis culture's being in the Upper Paleolithic of the Old World.

From a historical point of view, the Dent site (5 WL 269), 56 km north and a little east of Denver, Colorado, is significant. Here, in 1932, the association of chipped stone projectile points with articulated mammoth remains was, for the first time, generally accepted (Figgins 1933; Wormington 1957: 43-44). Two of the points, both found in situ, were fluted and of the type that since has been known as Clovis fluted. A third, broken, point was probably of the same type. A great many stones foreign to the area were found in the deposit that contained the remains of one male and 11 female mammoths. The stratigraphy of the site has been largely destroyed, but Harold E. Malde, of the U.S. Geological Survey, who visited the site in 1954, feels that the deposits date from a glacial or early glacial recessional phase. Haynes (1964) reports a radiocarbon date for the site of $11,200 \pm 500$ B.P. (sample I-622), a date that he accepts as accurate.

The Dutton site, in the northeast corner of Colorado, best known for its pre-Clovis component, contains a Clovis component as well (Stanford 1979: 105). Mammoth bone collagen from the level immediately below the Clovis component has yielded dates of $11,170 \pm 150$ years B.P. and 7880 ± 150

Table 1. Clovis Radiocarbon Dates (Haynes 1970: 79)

Site	Type	Game	Deposit	Date Years BP
Dent, Colorado	kill	mammoth	overbank alluvium	11,200±500 (I-622)
Clovis, New Mexico	hunting camp	mammoth bison	springlaid sand	11,310±240 (av.)
Miami, Texas	kill	mammoth	pond clay	
Shoop, Pennsylvania	camp	?	terrace soil	
Willianson, Virginia	camp	?	upland soil	
Borax Lake, California	camp	?	alluvial fan	
Ventana Cave, Arizona*	camp	?	volcanic debris	11,290±1000 (A-203)
Naco, Arizona	kill	mammoth	channel alluvium	
Lehner, Arizona	hunting camp	mammoth bison	channel alluvium	11,260±360 (av.)
Union Pacific (UP), Wyoming*	kill	mammoth	channel alluvium	11,280±350 (I-449)
Domebo, Oklahoma	kill	mammoth	channel alluvium	11,160±500 (av.)
Simon, Idaho	cache(?)	?	Prairie soil	
Leikem, Arizona	kill	mammoth	channel, alluvium	
Welling, Ohio	quarry camp	?	terrace soil	
Murray Springs, Arizona	hunting camp	mammoth bison	channel alluvium	11,230±340 (A-805)
Escapule, Arizona	kill	mammoth	channel slope	
Wells Creek, Tennessee	camp	?	upland soil	
Mockingbird Gap, New Mexico	camp	mammoth	channel slope	

*Questionable Clovis identification

years B.P. (samples SI-2877 and SI-3541) and additional samples have been submitted. A Clovis point was found on spoil dirt from the construction activity that brought the site to Stanford's attention. Adhering to the point, and to a flake and a horse tooth found with it, was soil from the matrix of the assumed Clovis level. Furthermore, the flake was found to fit on a core later excavated from that level (Stanford 1979: 115-116).

Just to the east of the southeast corner of the Central High plains, Clovis points were found associated with Mammoth bones at the Domebo site in Caddo County, Oklahoma (Loenhardy 1966; Gilbert 1979; Wilson 1966). Just within the southeast corner, at least one Clovis point has been reported (Gilbert 1979: 14).

Goshen Complex

This complex, which falls chronologically between Clovis and Folsom, has been dated at ca. 9,000 to 8,800 B.C. on the basis of work at the Hell Gap site in east-central Wyoming (Irwin-Williams et al. 1973), the only place it has been found. The complex has been accepted by Frison (1978: 30, 83), but Irwin-Williams et al. (1973: 46) note that Goshen shows many similarities to Plainview and that the two could easily be confused. Their description of the Goshen complex is as follows:

Typical projectile points of the Goshen Complex are lanceolate with parallel to slightly convex or concave sides and concave bases. In overall outline, they resemble the Clovis form. Flaking technology is excellent, probably executed by a combination of percussion and then pressure flaking. Most flake scars are uniformly directed at right angles to the long axis of the point. Most points are basally thinned by the removal of multiple flakes. Specimens are uniformly very thin and are edge ground along the lower one-third of their length. Also characteristic of the complex are simple convex-edged side scrapers and other side scraper forms; end scrapers with a lateral spur or beak, and small numbers of other end scraper types; spur perforators on small flakes; and utilized flakes. Also recovered were numerous bifacial pieces representing early stages in the manufacture of points and a single large tear-shaped bifacial knife. This industry contains the highest incidence of true blades of any Paleo-Indian complex at Hell Gap. This technologic feature, plus various similarities in projectile point outline and preference for scraper types, suggests parallels between the Plainview and Clovis complexes. True Clovis materials have been recovered from nearby localities, but none occurred in the Hell Gap valley itself. No Carbon-14 date is available for the Goshen Complex at Hell Gap, but its stratigraphic position indi-

cates a pre-Folsom, post-Clovis placement, about 9000 B.C.

Folsom Complex

This complex, dated at about 10,000 to 11,000 years ago, represents a people who hunted large, now-extinct bison, using distinctive fluted projectile points. The Folsom complex, most completely represented at the Lindenmeier site, will be described in detail in the discussion of that site. The complex received its name from the small town of Folsom in the northeast corner of New Mexico. Near there, unmistakable artifacts, Folsom points, were first found in indisputable association with the remains of an extinct form of animal, *Bison antiquus* (Cook 1927; Figgins 1927; Wormington 1957: 23-29). Bones eroding from an arroyo bank were reported to the Colorado Museum of Natural History (now the Denver Museum of Natural History) which sent a party to investigate. When the significance of the site became evident, various highly qualified archeologists were called in to observe the association of the stone artifacts with the articulated skeletons at this buried kill site. The distinctiveness of the associated points soon led to the identification of other sites, including Lindenmeier in northern Colorado, as belonging to the Folsom complex.

Lindenmeier Site

The Lindenmeier site (5 LR 13), located almost straight north of Denver and just south of the Wyoming line, is still, a half-century after its discovery, the site which has provided the most information about the Folsom complex. Excavation of this important site was carried out by the Smithsonian Institution between 1934 and 1938. For many years, the only information available from this site was in very brief reports by Roberts (1935a, 1935b, 1936a, 1936b, 1937, 1938, 1939a, 1939b, 1940, 1941) and a report of the geology by Bryan and Ray (1940). Fortunately, Roberts' notes were sufficiently detailed that, after his death, the material could be analyzed and a final report published by Wilmsen (Wilmsen and Roberts 1978). Regrettably, attempts to get permission to resume work at Lindenmeier have been largely unsuccessful except for geological work by Haynes (Haynes and Agogino 1960). During the 1935 season, the Colorado Museum of Natural History also had a small party at the site under the supervision of John L. Cotter (1938). Much of the collection made by the discoverers of the site, C.C. Coffin and R.G. Coffin, is in the local historical museum in Fort Collins, Colorado.

The Lindenmeier site is located in the Rocky Mountain Piedmont, in a valley which filled in after the Folsom occupation. Eventually an arroyo cut through the valley fill revealing the occupation level. During Folsom times there were two distinct activity

During Folsom times there were two distinct activity areas: a kill/butchering area and the habitation/camp area. Higher in the fill was a later and much less extensive Archaic occupation; late prehistoric artifacts have been collected from the surface.

Two acceptable radiocarbon dates for the Folsom level at the Lindenmeier site are available. One, for a sample of charcoal collected by Roberts during his excavation, is $11,200 \pm 400$ B.P. (9250 B.C.) (sample GX-1282) (Wilmsen and Roberts 1978: 39); the other, on charcoal collected by Haynes and others in 1959-1960, is $10,780 \pm 135$ B.P. (8830 B.C.) (sample I-141) (Haynes and Agogino 1960: 23; Haynes 1964: 1410; Wilmsen and Roberts 1978: 400). Wilmsen and Roberts (1978: 39-42) discuss in detail other dates attributed to the Folsom occupation which are either erroneously attributed or otherwise unacceptable, along with certain problems in the interpretation of the radiocarbon dates. A date of ca. 11,000 B.P. for the Folsom occupation at the site is generally accepted.

The Folsom fluted point, probably more than any other artifact type, has attracted the attention and excited the interest of professional archeologists, collectors, and the general public. The classic form is distinctive, easily identified, beautifully made, aesthetically pleasing and known to be of great antiquity by American standards. The Folsom point is described by Wormington (1957: 263).

The question of Folsom point typology is complicated by the fact that Folsom fluted points are frequently found in association with points which are otherwise identical except that they are unfluted. These are called both unfluted Folsom points and Midland points; this question is discussed further in the section on the Midland complex. Another variation that has received much less attention is what Wilmsen and Roberts (1978: 111-112) call pseudo-fluted points; instead of a true flute, there is simply a large flat original flake surface on one or both faces. Some points have a flute on one face and a pseudo-flute on the other. In general outline these resemble other Folsom points and make up nearly one fifth of all finished points at the Lindenmeier site. Folsom points, like other Paleoindian points, are commonly resharpened. Some broken points had new bases chipped on them. Others were reworked to produce cutting or scraping tools. Not all were reworked. Many of the broken points were apparently broken in the process of manufacture--either split lengthwise or snapped transversely by a hinge fracture. Other points were apparently broken or even shattered during use. The geographical distribution of Folsom points is given by Bell (1958) as the high plains of North America from Texas north to Alberta and Saskatchewan.

A second distinctive and diagnostic item in the Folsom assemblage is the channel flake, the flake removed in the production of the flute. These are very thin and show a single flake scar on one face and

multiple flake scars, usually laterally oriented, on the dorsal face. Out of nearly a thousand channel flakes from the Lindenmeier site, all but one was broken, apparently in the process of manufacture.

In addition to diagnostic points and channel flakes, the Lindenmeier site yielded a wide variety of other stone artifacts (Wilmsen and Roberts 1978). Apparently there are no categories or types of artifacts found at other Folsom complex sites that are not represented at Lindenmeier, and apparently no other site has all the types found at Lindenmeier, which, therefore, sets the standards for the complex. Other bifacially chipped artifacts include: projectile point preforms, with flutes on one or both sides; other preforms; small to large bifaces, probably used as cutting or chopping tools; and elongate specimens with a shape suggestive of drills, but without evidence of rotational wear. Unifacial specimens include unmodified flakes; utilized flakes, specimens with distal-edge retouch (end scrapers), specimens with single-edge retouch (side scrapers), specimens with two edges retouched (double side scrapers), notched specimens ("spokeshaves"); some of these have two notches and some appear to have small graver points as well, and specimens with definitely chipped tips (gravers). Several specimens resembling classic paleolithic burins and "limace" are very narrow, much-used scrapers. Other artifacts include: cores, choppers or pounders, flat abrading stones, slightly concave pigment grinding stones with hematite adhering, grooved abrading stones, stones with convex rubbing surfaces, and pieces of hematite and soft limestone showing evidence of abrasion. There was a large number of bone artifacts at the Lindenmeier site including: awls, bluntly pointed rib sections, needles with and without eyes, and a tubular bead. Various pieces of bone had been decorated by incising, including discoidal specimens with short incisions on the peripheries.

Unfortunately, much of the bone from the site was not saved so there is no information on what have come to be recognized as expediency butchering tools. However, the faunal remains that were preserved from the Lindenmeier site can be considered representative of the total inventory. Table 2 shows the total number of specimens and minimum number of individuals indicated (Wilmsen and Roberts 1978: 46).

Elida Site

Hester (1962) describes materials collected from what was apparently a single-component Folsom site in east-central New Mexico, just south of the study area considered here. The site was a blowout, one of 45 Early Man sites discovered by the collector in the immediate vicinity, and the collector had kept everything taken from the Elida site excepting a few points that were in another private collection.

Table 2. Lindenmeir Inventory from Wilmsen and Roberts (1978)

Species	No.	
<i>Terrapena</i> cf. <i>ornata</i> (Ornate box turtle)	2	1
<i>Lepus americanus</i> (Snowshoe hare)	1	1
<i>Lepus townsendii</i> (White-tailed jack rabbit)	35	2
<i>Cynomys ludovicianus</i> (Black-tailed prairie dog)	1	1
<i>Canis lupus</i> cf. <i>nubilus</i> (Gray wolf)	9	1
<i>Canis latrans</i> (Coyote)	4	1
<i>Vulpes fulva</i> (Red fox)	12	1
<i>Vulpes velox</i> (Swift fox)	1	1
<i>Camelops</i> sp. (Camel)	7	1
<i>Antilocapra americana</i> (Pronghorn)	10	2
<i>Odocoileus virginianus</i> (White-tailed deer)	6	1
<i>Bison</i> cf. <i>antiquus</i> (Long-horned bison)	524	13
Unidentifiable	128	
Total	741	

Next to Lindenmeier, this site may have yielded the greatest variety of artifacts from any Folsom component and the inventory provides a good approximation of the entire Folsom tool kit. The number of specimens in each category are in parentheses: points fluted both sides (8), points fluted one side (7), unfluted points (3), channel flakes (13), knives (15), flake knives (4), graters (23), hollow scrapers (spoke-shaves) (6), end scrapers (31), side scrapers (41), cores (16), utilized flakes (290) and unused flakes (116). The fluted points show a great variety of sizes and base fragments outnumbered tip fragments three to one. The unnotched points are highly variable and would not seem to represent a type. Channel flakes were all reused as artifacts. Most of the end scrapers were made on thick prismatic flakes, tend to be small and triangular, and often have graver-like points.

Other Folsom Sites

The Lubbock Lake site, in the northwest edge of Lubbock, Texas (just south of the Central High Plains), is a stratified site noted mainly for its Folsom component. Work at this site by Texas Tech University has continued, intermittently, since the 1940's (Sellards 1952; Black 1974; Johnson and Holliday 1980).

The Blackwater Draw locality (also just south of the Central High Plains) is in the middle of the eastern edge of New Mexico. This site is best known for its Clovis component, which is stratigraphically under a level containing the bones of hundreds of bison (probably of an extinct species) with which Folsom points were associated (Sellards 1952; Wormington 1957: 49-50). Evidence presented by Wendorf (1970) indicates that at both Blackwater Draw and Lubbock Lake there was a period between 8300 and 8600 B.C. (during Folsom times) when summers were markedly cooler and precipitation was more effective. Wendorf raises the question as to what cultural changes, if any, there were in the Folsom complex during this period of a few hundred years when there was considerable and rapid climatic change with corresponding marked changes in the vegetation. Thus far, not enough Folsom sites have been excavated to provide the basic data necessary for an answer.

The Lipscomb Bison quarry, located in the northeast corner of the Texas Panhandle, is interesting and potentially important, but excavation there has never been fully reported. In a preliminary article Schultz (1943) lists 26 stone artifacts, several of which are illustrated. Included are 18 projectile points or fragments (of the 10 illustrated, all are fluted and some conform to the classic Folsom shape), one end scraper, 4 side scrapers, 2 possible flake knives, and a channel flake. Eleven chips were also recovered. Bison *antiquus* remains included 14 articulated skeletons with the bones well fossilized;

detailed measurements are given on one of the largest male skulls. Charcoal and ash from the site gave evidence of fire.

Folsom points have been recovered from a number of other sites in the Central High Plains where relatively little additional information was secured, or where the information is not yet available in published form. The Linger site, located in the dune area on the east side of the San Luis Valley in south-central Colorado, yielded Folsom points and a few bison bones, probably of an extinct species (Hurst 1941, 1943; Wormington 1957: 29-30). Other artifacts associated included blades, scrapers, 2 atypical points and a channel flake. The Zapata site, similar to and a few miles from Linger, yielded a whole and a fragmentary Folsom point, 2 scrapers, a graver and a channel flake associated with bones (Wormington 1957: 30). The Powars site, near the small town of Kersey in northeastern Colorado, produced many classic Folsom points and snub-nosed end scrapers. The site was very sandy and the original deposit was apparently destroyed by wind action (Roberts 1937; Wormington 1957: 39). The Johnson site, near La Porte, Colorado (about 24 km from Lindenmeier) yielded a few Folsom points, scrapers and workshop debris (Wormington 1957: 40).

One of the first reports (perhaps the first) of a stone projectile point in association with the remains of an extinct species was by Williston (1902), who described a site on Twelve Mile Creek in Logan County, west-central Kansas. Although a point was found there in direct association with the skeleton of one, or five, or six extinct bison, it is not clear whether this was a kill site or whether a small herd had died of winter exposure including one animal that had been previously, but not fatally, speared in the shoulder. The point disappeared soon after its discovery, but on the basis of the drawing published by Williston (1902), it appears to be either Folsom or Clovis. Richard Rodgers, a graduate student at the University of Kansas, has been able to relocate the site.

Midland Complex

This complex is essentially the same as the Folsom complex except that the points, which are otherwise identical to Folsom fluted points, are unfluted. Midland points were at one time called unfluted Folsom points, and it is not uncommon to find fluted and unfluted points, or even an occasional point with a flute on only one side, at a single site, either Midland or Folsom. The relationship between Folsom and Midland points has been considered by various authors (e.g., Wormington 1957; Agogino 1969; Wendorf and Krieger 1959; Blaine 1968; Perino 1971; Judge 1970; Irwin and Wormington 1970). Irwin and Wormington (1970: 27) state that Midland points "are now regarded as a distinct type." Agogino (1969) takes the position that

some Folsom hunters preferred to flute their points and others did not, but he too recognizes Midland points as a type. Furthermore, he notes that at the Scharbauer site, the Midland horizon is below the Folsom horizon (Wendorf et al. 1955), while at Hell Gap, the Midland horizon is above the Folsom horizon (Smith and Agogino 1966: 201-203). The two complexes are generally considered contemporaneous.

Although the type site for the Midland complex is the Scharbauer site (near Midland, Texas, just east of the southeast corner of New Mexico), the complex is best represented at the Hell Gap locality in east-central Wyoming. The Texas site, however, is famous for the partial human skeleton (Midland Man) found there and generally accepted as dating from the Paleoindian period (Wendorf et al. 1955; Worthington 1957: 241-246).

The Midland complex at the Hell Gap locality is summarized by Irwin-Williams et al. (1973: 47) as follows:

The characteristic projectile points superficially resemble those of the Folsom assemblage [but are not fluted].

Other characteristic tools include numerous convex side scrapers, double side scrapers, and a few other side scraper forms, as well as beaked and angle-edged end scrapers. Also recovered were spur perforators, utilized flakes and retouched flakes, various denticulate forms of bifaces, and a single large teardrop-shaped bifacial knife. All these characteristics, with the exception of the relatively large number of side scrapers, are paralleled in the Folsom assemblage.

In addition to the lithic material culture, Locality II at Hell Gap produced evidence of two structures defined by circular alignments of post holes: a small structure, about 2 m in diameter, and a larger one, about 4 m in diameter. These are the earliest known definite remains of plains Indian dwellings. The Midland phase is dated by Carbon-14 at between 8440 and 8740 B.C. at Hell Gap.

Hell Gap Complex

Our information on this complex comes primarily from: several occupation localities in the vicinity of Hell Gap in east-central Wyoming (Irwin-Williams et al. 1973); the Casper site, a bison kill in central Wyoming (Frison 1974a); the Jones-Miller site, a bison kill and butchering site in extreme north-eastern Colorado (Stanford 1974: 29, 1978); and the Sister's Hill site, an occupation site in northeastern Wyoming (Agogino and Galloway 1965).

The Hell Gap level at the type locality has not been directly dated by radiocarbon, but a charcoal sample from below this level gave a date of about 8300 B.C., and the Hell Gap level at the Sister's Hill site, dated at about 7700 B.C., led Irwin-Williams et

al. (1973: 48-52) to date the Hell Gap complex at ca. 8000 to 7500 B.C. Agogino (1961) reports a date of 8890 B.C. for the level at Kimball Station containing Hell Gap points (and underlying an Agate Basin horizon), but Irwin-Williams and Frison do not comment on this date.

The only artifact diagnostic of the Hell Gap complex is its projectile point. Other artifacts from the Hell Gap level at the type site are reminiscent of the Agate Basin complex and include an abundance of various forms of side scrapers; fewer end scrapers, principally ones of the angle-edge or beak variety; large elongate bifacial knives; notched scrapers; spur perforators; utilized flakes; and one asymmetrical knife. The latter has a single rounded shoulder, a tapering convex stem and moderately convex blade edges. Projectile points occur in "unusually high proportion" and faunal remains are sparse. No dwelling remains were found and the occupations are thought to represent hunting camps used only briefly.

The Casper site in central Wyoming is a Hell Gap bison kill (Frison 1974). Here a steep-sided, parabolic sand dune had served as a trap into which bison were driven, then killed and partially butchered. A total of 60 separate projectile points or fragments was recovered; except for one Clovis point found on the surface of the sand, all were of the Hell Gap type. After having been broken, many were resharpened to be used again as projectile points; none showed much if any evidence of having been used as knives or butchering tools. Five other chipped stone tools were found: three were combination cutting and scraping tools made on large percussion flakes; the fourth, also a flake tool, had a convex cutting edge and a burin spall; and the last was a blade tool with nearly straight cutting edges. Of the 308 flakes recovered, 48 had resulted from impact fracture of projectile points, but none from the resharpening of any of the points found at the site. Most of the debitage appears to have resulted from the sharpening of cutting or scraping tools. Twenty river cobbles from the site are believed to have been used as hammerstones in the butchering process. Frison (1974) also included a great deal of insightful comment on bison procurement and butchering and on projectile point hafting.

The Jones-Miller site, a bison butchering site in extreme northeast Colorado (Stanford 1974, 1978) is the only excavated Hell Gap site reported from the Central High plains as here defined. Judging by the bones present and their distribution, several kills had taken place close by, and selected portions of the animals had been brought to the site for systematic and near-complete butchering. The various kills had apparently taken place at different seasons, but each involved nursery herds, since far fewer bulls were represented than cows, calves and yearlings. Among the stone artifacts, projectile points greatly predominated and several showed impact

at the Casper site, many of those from Jones-Miller had been used as knives in butchering and showed asymmetrical sharpening; the edges of some had even been backed (deliberately dulled). Other artifacts included four side scrapers or cutting tools and two plano-convex scrapers; a chopper was found near a hearth to the west of the bone bed. Several thousand flakes, many, at least, from resharpening tools, were found clustered in activity areas. Bone tools, slightly more common than stone, show little preparation; wear, polish, and striations occur primarily along broken edges. Bones used as tools were mainly ribs, but also included are metatarsals, metacarpals, humeri, and tibiae. Lithic analysis identified Spanish Diggings quartzite from east-central Wyoming, Republican River jasper from south-central Nebraska, and Alibates dolomite from the panhandle of Texas.

A highly unusual feature at the Jones-Miller site was a large post mold surrounded by nonfunctional artifacts (offerings?) near the center of the bone concentration. Stanford (1978: 93-100) suggests this might have had ceremonial significance comparable to that of "medicine posts" reported in conjunction with hunting in historic times (MacDougall 1896: 273).

Firstview Complex

The Firstview complex has been defined by Wheat (1972, 1978) on the basis of material recovered from the Olsen-Chubbuck site, a bison kill in the extreme east-central part of Colorado, about 16 km south of the town of Firstview in Cheyenne County. A radiocarbon determination on bone collagen provided a date of $10,150 \pm 500$ B.P. (8200 B.C.) (A-744) for the site. Originally the projectile points had been identified as Eden, Scottsbluff and Milnesand (Chubbuck 1959: 4-10; Wheat 1967: 51). Wheat noted considerable variation, with the points grading from Eden to Milnesand. Upon further analysis Wheat (1972: 140) concluded that most of the points should be assigned to a new type, Firstview points, and the rest classified as San Jon points, described by Roberts (1942). The type site for these points is near San Jon, in northeastern New Mexico, just south of the Canadian River and nearly at the Texas border.

Twenty-seven projectile points and fragments were recovered from the bone beds of the Olsen-Chubbuck site. Other chipped stone artifacts, not abundant, included: 3 end scrapers, one of which had two concave scraping edges, one on either side of the convex scraping end; one side scraper; a large thin flake knife and two used flakes. Chipping debris consisted of only 3 flakes. A hammerstone-anvil, three small used cobbles, and a limonite pebble were also recovered. Worked bone consisted of one well-made pin, 9.2 cm long, and four pieces of bone that showed cutting and/or polishing. Except for the

points, the artifacts are not diagnostic.

Wheat (1972: 152) gives the distribution of Firstview and San Jon points as follows:

Firstview points are known in moderate quantities in the southern plains, where they constitute a major type. Their center of distribution appears to be in the Clovis-Portales area of New Mexico. They are reported from the Clovis Lake beds (Howard 1935a and 1935b), Stratum 5 at Blackwater Draw No. 1 (Sellards 1952), and the Torrance County sites (Haynes 1955). The Olsen-Chubbuck site in southeastern Colorado is the most northerly reported occurrence of the type.

San Jon points are one of the most widespread of all Paleo-Indian projectile points. They are found in substantial quantities in Alberta (Wormington and Forbis 1965), in Montana (Forbis and Sperry 1952), Nebraska (Davis 1962), Wyoming (Finley site, but not from Cody Complex locus, Satterthwaite 1957: Fig. 5, Fi-y), Colorado (Dick and Mountain 1960; Wheat, this volume), and New Mexico (Howard 1935a; Roberts 1942; Sellards 1952; Haynes 1955). It may well be that subtypes will eventually be distinguished in this wide-ranging form.

After a review of six radiocarbon dates of sites that include the Firstview complex or sites containing artifacts of Firstview complex types, Wheat (1972: 156, 164) suggests the time span for the Firstview complex as extending from 8200 B.C. to 7200 B.C., or perhaps 6500 B.C. This span is somewhat earlier than his suggested range of 7000 B.C. to 6000 B.C. for the Cody complex to which the Olsen-Chubbuck site was originally assigned. The basis for his dating of these two complexes is as follows:

There are 3 radiocarbon dates from relatively pure sites which clearly date the Cody complex. These are:

6650 B.C. \pm 600 (I-245), Hell Gap site, Cody complex level;

6800 B.C. \pm 120 (UCLA-697A), Horner site;

6890 B.C. \pm 140 (UCLA-697B), Horner site.

There are 6 radiocarbon dates which date sites of the Firstview complex or sites containing some Firstview complex types. These are:

6150 B.C. \pm 300 (L-578A), Mac Haffie site-San Jon points;

6520 B.C. \pm 350 (A-512), Blackwater Draw No. 1, Unit E/F contact, post Firstview complex;

7217 B.C. \pm 600 (C-471), Lime Creek, Stratum I-San Jon points;

7930 B.C. \pm 670 (C-471, second run), Lime Creek, Stratum I;

7940 B.C. \pm 290 (A-489), Blackwater Draw No. 1, Unit E (Stratum 5);

Although the number of artifacts recovered from the Olsen-Chubbuck site was not great, much was learned of the hunting and butchering activities of the people. After a detailed analysis of the data and a comparison with evidence from some 20 other Paleoindian kill sites, Wheat (1972: 164) concludes:

Finally, as a result of the excavation of the Olsen-Chubbuck site, it can be asserted, with some degree of certainty, that during the latter part of the Paleo-Indian occupation of the Southern plains there were large, well-organized hunting parties, who had mastered the basic techniques of exploiting the economic potential of the great bison herds of the Great plains. These hunters had developed standard methods of hunting, of butchering and preserving great quantities of meat, of hide processing, and probably of making tailored skin garments and shelters. The pattern of exploitation observed at the Olsen-Chubbuck site almost certainly marks a point in a continuous development which began with the earliest bison hunters of late Clovis or early Folsom times, became more sophisticated during late Paleo-Indian times, and changing only in minor aspects through the millennia, constituted the basic economic pattern of the Plainsmen until the near extinction of the bison (and the plains Indians) in the late 1800's.

Other point types very similar to Firstview are Milnesand, Agate Basin, and Plainview, which Wheat (1972: 148) considers "variations of lanceolate points . . . sharing a number of characteristics of flaking, edge-grinding, basal thinning, and so forth." The presence of Firstview, Plainview, Milnesand or San Jon points in a component of a site lead Wheat to consider such a component as being assignable to, or closely related to, the Firstview complex. He sees the Firstview complex as earlier than, and parallel to, but distinctive from, the Cody complex, where the diagnostic artifacts are Eden and Scottsbluff I, II and III points and Cody knives. Only at the Claypool site does he find any overlap; there, San Jon points are found with a Cody complex assemblage. Wheat considered retaining the name Portales complex proposed by Sellards (1952: 72-74) on the basis of Stratum 5 at Blackwater Draw No. 1, but concluded that the situation at that site was too ambiguous and chose to name the complex "Firstview", for a small Colorado town near the Olsen-Chubbuck site. Thus the Portales complex as manifested at Blackwater No. 1 would become the Firstview complex, with perhaps some older and younger artifacts mixed in.

Since not all archeologists have accepted Wheat's subsuming the Plainview and Milnesand complexes under his Firstview complex, these will be described also.

Plainview Complex

This complex was first described by Sellards (1947) on the basis of material excavated near Plainview, Texas, which is essentially at the middle of the southern limit of the Texas Panhandle. Probably no other Paleoindian complex has been so diversely interpreted. Some authors have used Plainview as a general catchall for sites producing parallel-sided points with concave bases. This usage reflects, at least in part, the fact that there was considerable variation in point styles at the type site. Wheat (1972: 148) groups Plainview points, along with Milnesand, Agate Basin, and Firstview points as essentially a single type, "variations of lanceolate points . . . sharing a number of characteristics of flaking, edge-grinding, basal thinning, and so forth." He assigns these four point types, which form a series or continuum, and also San Jon points, to his Firstview complex. He does recognize, however, that there are sites which have produced only Plainview points.

Johnson and Holliday (1980) agree with Wheat that the points named above are basically similar, but these authors concentrate on the Plainview complex. One of their chief concerns is distinguishing between Plainview points and Golondrina points, which they closely resemble. Their assignment of sites, most of which are out of our Central High Plains area, to these two complexes is summarized in Table 3.

Of special significance for this summary of Central High Plains archeology is the identification as Plainview of points from the Lime Creek and Red Smoke sites by Davis (1953a, 1962). These two sites, located about 0.8 km apart and near jasper quarries, are important because they are primarily camp and stone-working sites. Their Plainview identification has been seriously questioned by Wheat (1972) and rejected by Johnson and Holliday (1980: 104), who suggest a possible Frederick identification for the so-called Plainview points found in the upper level (III) at Lime Creek and in an intermediate level (V) at Red Smoke. Wheat further points out that Davis (1962) misidentified two points from the lowest level at the Lime Creek site as Scottsbluff and Milnesand. According to Wheat, these points conform to the descriptions of San Jon points, although the so-called Milnesand point was broken in the process of manufacture and never finished. Wheat also considers that the Lime Creek knives are actually preforms. Thus, to Wheat, the San Jon points in Level I at the Lime Creek site indicate the presence of the Firstview complex, which he considers related to Plainview even though the levels thought by Davis to be assignable to Plainview are not. Furthermore, this change in identification better fits the radiocarbon dates for the Red Smoke and Lime Creek sites, other-recent.

The assignment of sites to the Plainview complex

Table 3. Plainview Sites (after Johnson and Holliday 1980)

Site	Location and comments	Radiocarbon dates and comments	References
Plainview	Southern Texas Panhandle. Mesa kill of over 100 extinct bison.	9800 \pm 600 B.P. Estimated (old method) 7100 \pm 160 B.P. Not reliable (old method)	Broecker and Kulp 1957 Brannon et al. 1957 Sellards et al 1947 Knudson 1973
Bonfire shelter	Southwest Texas. Bone bed 2 represents 3 separate kills of over 120 extinct bison.	10,230 \pm 160 B.P. Accepted 9920 \pm 150 B.P. Accepted 10,100 \pm 300 B.P. Accepted	Dibble 1968 Dibble 1970 Dibble 1970 Dibble and Lorrain 1968
Lubbock Lake	Just south of Texas Panhandle. Kill/butchering site, 6 or more bison	9883 \pm 350 B.P. Estimated (old method) 9960 \pm 80 B.P. Accepted	Libby 1955 Johnson and Holliday 1980 Sellards 1952 Black 1974 Wheat 1974 Kelley 1974 Green 1962 Johnson 1976 Holliday 1977
Lake Theo	Near southeast corner of Texas Panhandle. Limited testing.		Harrison and Killen 1978
Lone Wolf Creek	West-central Texas.		Cook 1927 Riggins 1927 Wermington 1957: 110
Blackwater Draw Locality #1	Center east edge of New Mexico		Wheat 1972: Hester 1972, 1975a: 252, 1975b: 252 Sellards 1952: 74

Table 3. Plainview Sites (after Johnson and Holliday 1980)
continued

Site	Location and comments	Radiocarbon dates and comments	References
St. Mary's Hall	Central Texas, camp area		Hester 1976, 1977a, 1978
Johnson Heller	South Texas.		Birmingham and Hester 1976
McCann	Central Texas.		Preston 1969
Acton	Central Texas.		Blaine et al. 1968
Pumpkin Creek	Southern Oklahoma		Wykoff and Taylor 1971
Nall	Oklahoma Panhandle. Surface collection.		Baker et al. 1957
Perry Ranch	Southern Oklahoma. Probably Golondrina.		Saunders 1976 Saunders and Penman 1979
Levi Rock shelter	Central Texas. Probably Golondrina.		Alexander 1963
Red Smoke	Southwest Nebraska. May be Frederick or Goshen.		Davis 1953
Lime Creek	Southwest Nebraska. Wheat (1972: 144) identifies point as Frederick.		

is based on the presence of Plainview points. The type description was presented by Krieger (Sellards et al. 1947: 938-944). The expanded definition, which appeared in Suhm et al. (1954: 472-473), is also to be found in Bell (1958: 74-75) and in Wormington (1957: 264-265).

Since information on the Plainview complex comes almost entirely from kill and/or butchering sites, we probably do not know the full extent of the artifact inventory. In addition to Plainview points, there may be one or more of the following types: Firstview, Milnesand, Agate Basin and San Jon. There is still some uncertainty as to whether some points resembling Meserve (also called Dalton) points are distinct types or represent resharpened Plainview or Frederick points. The use of projectile points for butchering tools and their resharpening or modification for this purpose is generally accepted (Wheat 1972, 1976; Johnson and Holliday 1980). Other Plainview tools include a limited number of unspecialized stone cutting and scraping tools and bone expediency tools, none diagnostic.

The Pigeon Cliff site, about 19 km north of Clayton in the northeast corner of New Mexico (Steen 1955), had a component that was assigned to the Archaic period, but which should probably be considered late Paleoindian with Plainview or Frederick affiliation. The site was at the edge of an ancient swamp which apparently attracted hunters sporadically. In the middle stratum, associated with a large number of bison bones, were found a large projectile point, stemmed and tanged, a graver, and what Steen called a firebox. Apparently from a lower level came what Steen called a reworked Clovis fluted point (probably a Meserve point) and perhaps a milling slab and mano. Wendorf (1960) reports a radiocarbon date of 8280 ± 1000 B.P. for charcoal from the "firebox." The site was destroyed by construction work.

Two Plainview points and one Meserve point are reported by Lintz (1978) from the Johnson-Cline site, an upland dune site in Texas County, the middle county in the Oklahoma Panhandle.

Milnesand Complex

It is uncertain whether the Milnesand complex will continue to be a useful taxon or whether it should be subsumed, as Wheat (1972) suggests, under the Firstview complex, with Milnesand points being one of the possible points associated with this later complex. The Milnesand site, a kill or butchering site, is located in extreme eastern New Mexico a little south of the middle (Sellards 1955). The diagnostic points resemble Plainview points and the type site was considered by Sellards to be related to the Portales complex, essentially what Wheat (1972) is calling the Firstview complex. Wormington (1957) and Bell (1958: 54) give the distribution of Milnesand points as wide-spread over the plains. A "Milne-

sand" point from the Lime Creek site (Davis 1962) has since been reidentified as a San Jon point. Except for the points, there are no traits diagnostic of the Milnesand complex, which also contains scraping and cutting tools.

With regard to Milnesand points, Wheat (1972: 146) states:

Milnesand points were first described as a separate category by Sellards (1955: 339-344), based on a series of 23 projectiles recovered at the Milnesand site some 40 miles (64.4 km) south of Portales, New Mexico. This series has now been considerably augmented by the publication of 81 additional projectile points by Warnica and Williamson (1968: 16-24). As found in both series, Milnesand points are relatively broad, lanceolate projectile points with bases which range from slightly concave to slightly convex.

Agate Basin Complex

This complex is probably related to the Firstview complex as defined by Wheat (1972) who sees Agate Basin points, along with Milnesand, Plainview, and Firstview, as all being variations on a common pattern.

The Agate Basin complex is known primarily from the northwest plains, but surface finds of Agate Basin projectile points are reported from the foothills region in the general vicinity of Denver, Colorado (Irwin-Williams and Irwin 1966: 219). The Agate Basin site, located in the center of the extreme eastern edge of Wyoming, received limited attention from Roberts (1943, 1951, 1961) and was thoroughly investigated later by Frison (1978: 150-168). At Hell Gap, the best represented complex was Agate Basin, dated at ca. 8500 to 8000 B.C. (about 10,500 to 10,000 years ago). This dating is apparently accepted by Frison (1978: 23, 31, 32) in spite of a date of about 7400 B.C. from the Brewster site (in the Agate Basin locality). If the 7400 B.C. date is also correct, then there would have been considerable overlap between the Agate Basin and Hell Gap complexes. Such an overlap may well have existed, for two determinations on humic acid from the Agate Basin occupation layer at the Frazier site yielded a date of 9650 ± 130 B.P. (7700 B.C.) and 9550 ± 130 B.P. (7600 B.C.) (samples SMU-31 and SMU-32, *Radiocarbon* 16: 373) with an average of 9600 B.P. given by Wheat (1979: 152).

The Agate Basin site was a bison kill, probably a box-canyon-like arroyo up which a small herd of bison was driven until it was trapped at the head. A butchering/processing area was located up the arroyo a short distance from the kill area. Two or three separate functions of the site are indicated, all, however, assignable to the Agate Basin complex. Butchering was thorough, leaving few articulated units. The ages of the young animals suggest a late

winter kill.

Chipped stone artifacts, in addition to points, from the Agate Basin site appear to have been effective but not finely finished. Included are a variety of large cutting and scraping tools, several end scrapers and a wide assortment of retouched flakes and blade tools. Broken bones had probably been used as butchering tools, but bone preservation was not good enough to permit verification that bones suspected of having been tools had actually been used (Frison 1978: 163-176).

In the Agate Basin complex occupations at Hell Gap, the characteristic tools, in addition to the projectile points:

... include a large variety of well-made single and double sidescrapers, notched flakes, spur perforators, simple retouched flakes, and utilized flakes. End scrapers, principally of the beaked and angle-edged forms, are present but are less prominent than previously. There are also some interesting new tools, including a very large form of thin elongated bifacial knife. Bone tools are never common in the Paleo-Indian complexes at Hell Gap, but a delicate eyed needle and a notched and flattened implement are among the Agate Basin materials (Irwin-Williams et al. 1973: 47).

In one Agate Basin occupation at Hell Gap, there was evidence of three superimposed circular structures averaging about 2 m in diameter. The circles consisted of post holes, but no other features were identifiable (Irwin-Williams et al. 1973: 47).

Cody Complex

The Cody complex is widespread over the high plains from Alberta and Saskatchewan, Canada, south into northeastern New Mexico (Wormington 1957: 132-134; Wheat 1972: 152). Wormington (1957: 136-137) proposed that the name "Cody" be applied to the complex characterized by Scottsbluff and Eden points and Cody knives. It was named after the Cody locality in northwestern Wyoming where it was found at the Horner site, investigated by Jepsen (1953a). Irwin-Williams et al. (1973: 52) suggest a date for the Cody complex of ca. 6800 to 6400 B.C.; at the Hell Gap site in southeast Wyoming they have a single radiocarbon date for the Cody complex level of 6650 B.C. (8600 B.P.). Frison (1978: 33-34) apparently accepts their dating of about 8800 to 8400 B.P. but questions a number of radiocarbon dates from the Finley site, in southwest Wyoming, and the Horner site. He reports that the Cody complex is widespread, extending from lower elevations in the plains and intermountain basins to timberline, including an extensive level at the Medicine Lodge Creek site in north-central Wyoming (Frison 1976, 1978; Frison and Wilson 1975).

Within the Central High Plains, the Cody complex is best known from the Claypool site in Wash-

ington County, Colorado, about 160 km east of Denver. Information on this site comes from extensive surface collections made by Bert Mountain and Perry Anderson and from limited controlled excavations by the University of Colorado (Dick and Mountain 1960; Malde 1960; Wormington 1957: 128-132). Scottsbluff points have been found as far southeast as Louisiana, and Eden points as far northwest as Alaska, but presumably without the rest of the Cody complex (Wormington 1957: 123-124).

The diagnostic points of the Cody complex are: Eden points, plus Scottsbluff I, II and III points, which Wormington (1957: 136) would classify together as Cody points although points of the various types appear to have areas of distribution that extend beyond that of the Cody complex. According to Wormington's definition, Cody points are essentially what were once called Yuma points.

The type site for the three varieties of Scottsbluff points is the Scottsbluff Bison quarry, located in the extreme west-central Nebraska Panhandle, where these points, previously known from surface collections, were finally found in a kill site (Barbour and Schultz 1932; Schultz and Eiseley 1935). Eden points were first excavated at the Finley site, near Eden, Wyoming, where they were also associated with bison remains (Howard et al. 1941; Howard 1943; Moss et al. 1951; Hack 1943; Frison 1978). Another Wyoming site, the Horner site, has contributed a great deal of information on the Cody complex (Frison 1978).

Other artifacts attributed to the Cody complex at the Hell Gap site (Irwin-Williams et al. 1973: 50) and/or at the Claypool site (Dick and Mountain 1960) include: ground-bit end scrapers, end scrapers on large flat flakes, asymmetrical end scrapers, end scrapers retouched over the entirety of the ventral surface, side scrapers, raclette scrapers, notched flakes, spur perforators, denticulates, utilized flakes, and grooved pieces of sandstone. Chipped stone drills were found on the surface of the Claypool site. Some of the points had apparently also been used as knives.

At Lamb Spring (5 DA 83), just southwest of Denver, excavations by Wedel produced evidence of an Eden-Scottsbluff (Cody) occupation (Wedel 1963: 14) which provided radiocarbon dates of 8870 ± 350 B.P. (6920 B.C.) and 7870 ± 240 B.P. (5920 B.C.) (samples M-1463, SI-45) (Crane and Griffin 1968: 102; Long 1965: 249).

For a discussion of a similar complex with which the Cody complex could be confused, see the section on the Firstview complex in this overview.

Kersey Complex

The Kersey complex is reported from the Jurgens site (5 WL 53), 65 km northeast of Denver, Colorado. The projectile points diagnostic of

this complex are considered by Wheat (1979: 152) to be a:

. . . regional development of the stemless lanceolate projectile point tradition represented by the Firstview and Milnesand complexes of the Southern and Central Great plains. In this tradition, stemming of projectile points occurs in both Firstview and Kersey points only on pieces salvaged from broken primary points by reworking, while broken Milnesand points were salvaged by a continuous reduction which maintained the essentially lanceolate character of the primary point morphology.

A single radiocarbon date from the Jurgens site of 9070 ± 90 B.P. (SI-3726) (mistakenly reported as 9070 B.C. by Wheat) is consistent with this interpretation and is consistent with a date of 9600 ± 130 B.P. (SMU-31 and SMU-32) for the Frazier site, an Agate Basin complex site a kilometer away in the same (Kersey) terrace, but slightly lower stratigraphically (Wheat 1979: 152).

Wheat's analysis of the artifactual and other data from the Jurgens site is detailed and excellent. The non-reworked Kersey projectile points from the site are represented by 28 specimens, of which three are complete or nearly complete, and reworked points by 33 specimens.

Bifacially-chipped stone knives from the Kersey complex, as classified by Wheat (1979: 84), include: "Stemmed or Hafted knives . . . a Curved Stemmed knife . . . Lanceolate Stemless knives and . . . Wide Flat Stemless knives." The stemmed knives resemble large, stemmed projectile points but are larger, relatively wider and have well-defined shoulders. Some were resharpened so often that their original long blades with convex edges were reduced to short triangular blades, still having, however, the original square bases. Some knives have serrated edges.

Other chipped stone artifacts in the Kersey complex include: preforms, pebble tools, cores or core-hammerstones, combination tools, denticulates, beaks or gravers, end scrapers (of various types), double side-and-end scrapers, side scrapers, double side scrapers, and flake knives. Ground or pecked stone artifacts include: a stone tube (perhaps a pipe), grinding slabs, handstones, anvil/hammerstones, abrading stones, grooved shaft-abraders, and various stream pebbles and cobbles. Bone and antler artifacts include: antler flaking-hammers, atlatl hooks, bones grooved for breaking, an engraved ulna, and various bones and bone fragments used as impromptu tools, probably for butchering. Many of the latter conform to definite patterns in that particular bones were selected and modified, by breaking, in the same ways.

At the Jurgens site, Wheat (1979: 146) noted areas of flaking debris and was able to identify three different activity areas: a long-term camp or

habitation site, a short-term camp site, and a butchering or processing site. Each activity leaves a distinctive assemblage of artifacts and debris. Apparently the kill site was elsewhere.

Alberta Complex

Sites of this complex apparently have a distribution to the north of the Central High Plains, but two sites, Hell Gap in the extreme east of central Wyoming (Irwin-Williams et al. 1973) and the Hudson-Meng site in northwestern Nebraska (Agenbroad 1973, 1974a, 1974b) are close enough that the complex should be mentioned here. Irwin-Williams et al. (1973) suggest dates of ca. 7500 to 7000 B.C. for the complex, dates which Frison (1978: 83) apparently finds acceptable. Alberta points were described by Wormington (1957) and Bell (1960) and in general resemble Scottsbluff points.

Frederick Complex

The Frederick complex is defined by Irwin-Williams et al. (1973: 50-51) on the basis of material excavated at Hell Gap in east-central Wyoming. The complex appears to be closely related to that from the poorly-known Jimmy Allen site, located near the Colorado border, nearly straight south of Laramie, Wyoming (Mulloy 1959; Wormington 1957: 144-146). The diagnostic points from the two complexes are very much alike. A radiocarbon date from the Jimmy Allen site of 7900 ± 400 years B.P. (sample M-304) (Mulloy 1959), and a Frederick complex date from Hell Gap (sample number not given) suggest dates of ca. 6400 to 6000 B.C. for the complex (Irwin-Williams et al. 1973: 51). Perino (1971: 2) gives the distribution of Allen points as the western plains and lower flanks of the Rocky Mountains from New Mexico to Alberta; presumably a similar distribution will be established for Frederick points. Recently a bison kill/butchering site in the southeast corner of the Nebraska Panhandle, the Clary Ranch site, assignable to the Frederick complex, has been tested in preparation for extensive excavation (Myers, Tanner and Corner 1980). The upper levels at both the Lime Creek and Red Smoke sites in southwest Nebraska may also be assignable to the Frederick complex (Wheat 1972; Johnson and Holliday 1980). Irwin-Williams and Irwin (1966: 219), in a brief summary of the prehistory of the central foothills of Colorado (essentially the Denver Basin), state that Frederick points have been recovered there, but they do not indicate from which sites nor state the source of their information. Frison (1978) includes limited comments on the Frederick complex from Irwin-Williams et al. (1973) but adds no additional data.

The Frederick complex, as manifest at Hell Gap, is described by Irwin-Williams et al. (1973: 50-51) as follows:

The typical projectile point seems essentially unrelated to the slowly evolving tradition represented by the Agate Basin-through-Cody continuum. It has a lanceolate outline with a markedly concave base and no distinguishable shoulder or stem. More diagnostic, however, is the specific technique of oblique parallel pressure-flaking executed with great care in a specific order from tip to base so that many of the flakes carry over across the mid-section and result in a thin lenticular cross section. These closely resemble the type termed Jimmy Allen, distinguished principally by a greater degree of basal concavity, which may have spatial or chronological implications. Also diagnostic are bifacial knives made on or similar in form to the Frederick projectile point type. The remainder of the tool kit displays both similarities to and differences from earlier periods. The scraper class is dominated by end scrapers, particularly the ventrally retouched, asymmetrical, and ground bit forms. Raclette scrapers, along with several types of side scrapers, are present but are of subordinate importance. Spur perforators, notched flakes, retouched and utilized flakes, and several rubbing stones also occur. The bone industry is better developed than in the earlier complexes and includes well-made bone awls and several well-made incised bone beads.

The structure uncovered at Locality I differs from those in the Agate Basin and Midland occupations on the one hand and shows close parallels to those of later high plains groups on the other. Instead of post hole circles, the dwelling was defined by a circle of small boulders similar to those used by historic tribes to hold down the hide coverings of tipi-like structures. Preliminary information on faunal remains from the Frederick occupation indicates a somewhat more varied use of resources, including not only bison, but also deer, numerous small animals, and a few freshwater shell fish.

Frontier Complex

The Allen site (25 FT 50), in Frontier County, southwestern Nebraska, is the type site for the Frontier complex. Holder and Wike (1949), who excavated the site, considered this complex Archaic, although Wedel (1961: 74-75) discusses it along with the Early Big Game Hunters, i.e., as part of the Paleoindian period. The occupation zones at the Allen site were buried about 6 m below the surface. The radiocarbon dates from the site are somewhat puzzling; two reported by Johnson as from the lower occupational zone are 8274 - 500 B.P. and 10,493 - 1500 B.P., while a third sample, which was a mixture of charcoal from the upper and lower

zones, is 5256 - 350 B.P. (F. Johnson 1951: 5, 14). The similarity of the artifact assemblages from the two zones does not support a several-thousand-year age differential. Roberts (1951: 21 f.n.) provides the information that the 10,493 B.P. date was for a sample from below the lowest occupational level and hence older than it. Davis (1953) suggests that the Frontier complex material from the Allen site equates with Zone IV at the nearby Red Smoke site (25 FT 42). There Zone IV lies below Zones V, VI and VII, the latter dated at 8862 - 230 B.P. (sample C-824) and 7970 - 210 B.P. (sample Tx-333). Davis, who excavated Red Smoke, feels that the 7970 B.P. date is closer to accurate (in Deevey et al. 1967: 451), in which case the 8274 B.P. date for the Allen site appears reasonable. Such a date would place the Frontier complex at essentially the temporal boundary between the Paleoindian and the Early Archaic periods.

There is doubt as to whether the points from Stratum V at the Red Smoke site were properly classified as Plainview by Davis (1953). Wheat (1972: 154), citing some unidentified source, states that Irwin refers to these points as Meserve. I. Johnson and Holliday (1980: 102, 104) do not accept a Plainview identification for Red Smoke points and suggest that they may actually be either Frederick or Goshen. Myers (Myers, Tanner and Corner 1980), on the basis of his work with the Frederick complex as represented at the Clary Ranch site, considers Meserve points to be reworked Frederick points.

The Frontier complex, unfortunately, has no truly diagnostic artifacts or traits. At the Allen site, the quality of workmanship on chipped stone tools was only fair and the total collection not great. Projectile points were both small and large. The small ones, about 4 cm long and 2 cm wide, were leaf-shaped with concave bases. One example was found in each of the two levels, and two possible blanks for such points were found in the lower level. The large points, known only from 13 fragments and blanks, were also found in both levels. These points, which had been about 7 cm long and 2.5 cm wide, are more parallel-sided than the small ones. The butts are slightly constricted and the bases are slightly concave. In outline, the large points are similar to Plainview points. The small points are similar to ones from Signal Butte in the Nebraska Panhandle (Strong 1935: 233, pl. 25:1:0) and from Deadman Cave near Salt Lake City, Utah (Smith 1941). Scrapers of the Frontier complex are generally trapezoidal "to the virtual exclusion of the familiar plano-convex or thumbnail scrapers." Five scrapers resemble so-called Clear Fork gouges. One thin ovoid blade and eight larger flat lanceolate blades were recovered, as were three expanded base drills. Ground stone artifacts included abrading stones, possible bolas weights, and hammerstones. Worked bone included needles, awls and a straight "fish-hook," plus miscellaneous pieces of worked bone

scrap. Evidence of 20 campfires or hearths, some of them heavily burned, were found; none of the hearths had been prepared. Field identifications of faunal material included bison, antelope, deer, coyotes, rabbits, mice, rats and prairie dogs; beaver, fish, reptiles, amphibia, and birds were rare. Clam shells and mud dauber wasp nests were also found, the latter burned and broken open. Most of the faunal remains were found in Level I with only a few bison bones in Level II (Holder and Wike 1949)

CHAPTER TWO

THE ARCHAIC PERIOD

One of the least known periods of plains prehistory, commonly called plains Archaic, lasted from about 8000 years ago (6000 B.C.) until about 1500 years ago. Its beginning is marked by the appearance of large notched spear or dart points and ends with the appearance of pottery. Also, there is no evidence in Archaic sites of the fauna, mostly large, that became extinct at the end of the Pleistocene; only modern forms occur. In his volume *Prehistoric Man on the Great Plains*, Wedel (1961: 86-87) devotes little more than one page to the Archaic period of the Central plains and bases that primarily on the excavation of one site on Logan Creek in Burt County, extreme eastern Nebraska. Most of our information on the Archaic occupation of the high plains comes from the investigation of sites in the foothills and at high altitudes near Denver, Colorado. For a general chronological framework, the recent work by Frison (1978: 83) is useful. His three-part division dates the Early plains Archaic at 6000 B.C. to 3000 B.C., the Middle plains Archaic at 3000 B.C. to 500 B.C. and the Late plains Archaic, overlapping with Middle Archaic, at 1000 B.C. to A.D. 500.

EARLY ARCHAIC

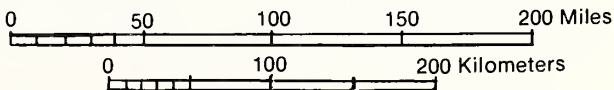
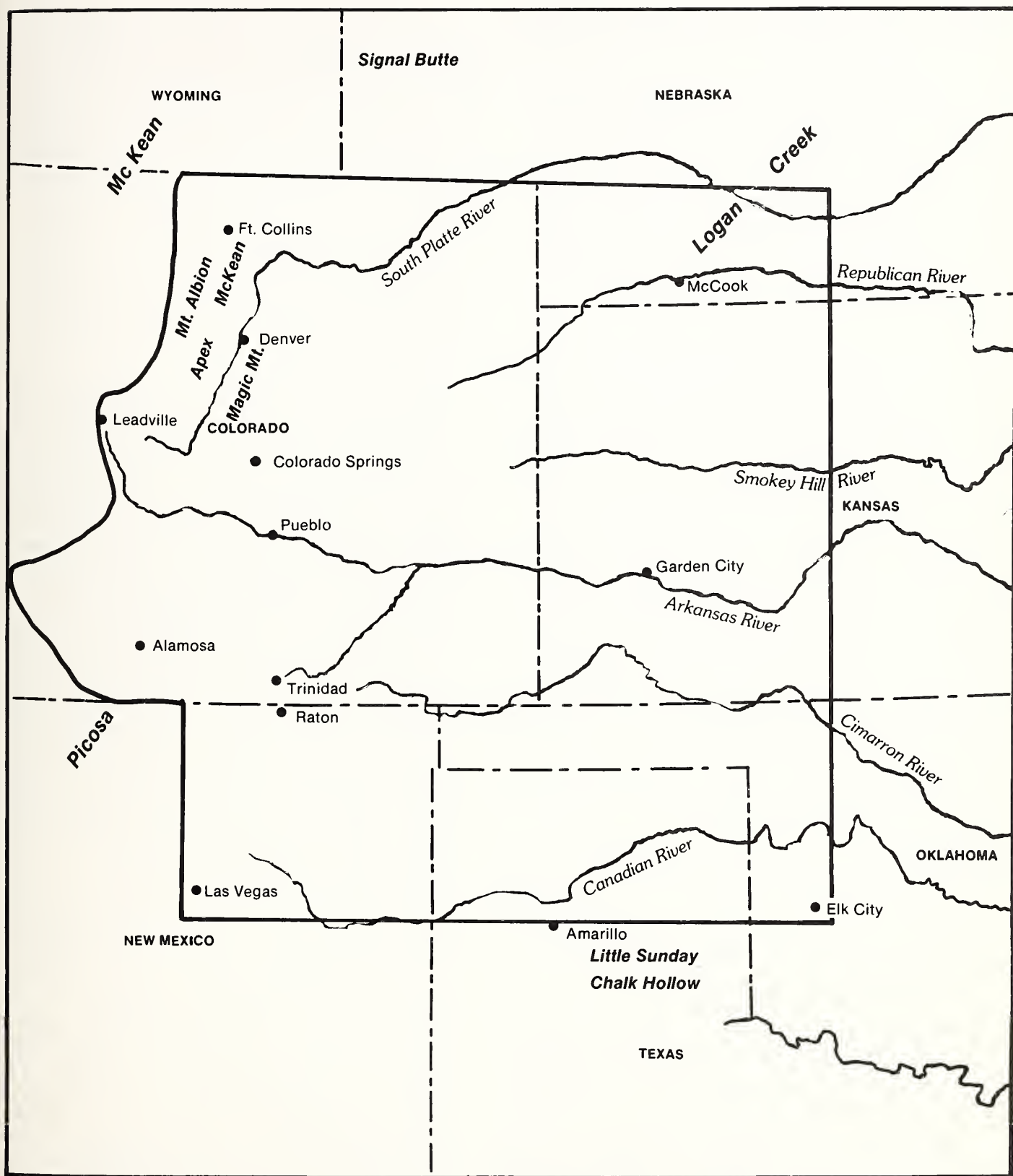
Logan Creek Complex

In the northeastern corner of our Central High Plains a few Archaic sites assignable to the Logan Creek complex have been reported (Kivett 1962; Carlson and Steinacher 1978; Grange 1980: 12-47). The Logan Creek Complex was defined by Kivett (1962) on the basis of excavated material from the Logan Creek site (25 BT 3) located in northeast Nebraska, well out of our area of concern. The diagnostic artifacts included small to medium-sized, side-notched triangular points, often with ground bases; those with concave bases were 20 to 49 mm long and those with straight bases 17 to 35 mm long. A third but rare type is triangular, unnotched with basal thinning, and 26 to 30 mm long. One concave base section of a parallel-sided point with smoothed and thinned basal edges had originally been about 55 mm long. A common scraper type at the Logan Creek site is plano-convex with side notches, usually 15 to 25 mm long, with one specimen 49 mm long. Small end scrapers of the usual Central plains type are rare and up to 24 mm long. Both crude lanceolate blades and delicately flaked parallel-sided

blades (represented only by sections) are also present but rare. One T-shaped drill was found. Both milling slabs and handstones were recovered. Bone artifacts and fragments included spatulate forms with serrated edges made from heavy rib sections, splinter awls (common), polished bone scrap (common), tubular beads up to 24 mm long, shaft wrenches (rare), fishhooks (rare), flakers (common), antler drifts and bone needles. Worked mussel shells with serrated edges were also found. Radio-carbon dates from charcoal samples are 6633 - 300 years B.P. and 7250 - 300 years B.P. (about 6300 and 5700 B.C.) (samples M-837 and M-1018). These dates place this site and complex in the Early Archaic. Kivett sees the Logan Creek complex as related to ones to the east, but extending over much of Nebraska, where it is known only from sites south and east of a northeast-southwest diagonal line that cuts the state in half (Carlson and Steinacher 1978:

Figure 1).

Our best data from a Logan Creek complex site within the Central High Plains area comes from the Spring Creek site (25 FT 31), a multicomponent site in Frontier County, southwest Nebraska (Grange 1980: 21-47). Because of dam construction time pressure, this extensive site was little more than sampled. It had apparently been used repeatedly by Archaic people, who each time left a hearth and a concentration of bone. The artifact inventory corresponds closely to that of the Logan Creek site except that notched scrapers were not found. Of the 21 projectile points, most were side-notched with a few corner-notched or lanceolate; considerable individual variation is shown. Scrapers were common, but these also showed considerable variation, with thin unifacial side scrapers made on irregular flakes dominating. Bifacial knives and core choppers were present but not common. One grinding slab and four manos were recovered. Bone artifacts were surprisingly abundant and included ulna picks, a scapula pick, fleshers, a shaft wrench, bone abraders, splinter awls, socketed long bones (perhaps digging implements), rib flakers, a tubular bone bead and polished bone fragments. In the faunal remains modern bison was by far the most abundant (a minimum of 12 individuals); other species included wolf or dog (a minimum of five individuals), swift fox, deer, antelope, beaver, cottontail, pocket gopher, prairie dog, vole, pintail, goose and common crow. Nearly all of these later species were represen-



SELECTED ARCHAIC COMPLEXES

ted by only one individual. A radiocarbon date on a combined charcoal sample (M-1364) from six features is 5680 - 160 B.P. or 3730 B.C., which, if recalibrated, would be 4555 B.C. In any case, this date is considerably later than those from the Logan Creek site itself, but still within the Early plains Archaic period.

Three sites (25 FM 4, 25 CN 52 and 25 CN 61) from the south-western corner of the Nebraska Panhandle probably date from the Early plains Archaic period. However, we have no information on these excepting the observations by Carlson and Steinacher (1978: 5) that they have yielded "generalized side-notched points which may be related to the Bitterroot and/or Salmon River types believed by Reeves (1973) to date to slightly before 3000 B.C."

The Altithermal

Major problems of the Early plains Archaic involve the question of the Altithermal, described by Antevs (1955) as a period warmer and dryer than the present, following the period of the Paleoindian big game hunters. Scientists have presented a variety of interpretations as to the effect that the Altithermal had on aboriginal populations. Recently Benedict (1979), who has worked extensively at sites in the foothills and mountains of northern Colorado, summarized the archeology of that area in relationship to the Altithermal. His position is that "the Altithermal was real, severe, more complex than generally envisioned, felt in virtually all parts of [the] western United States, and was the cause of population dislocations that affected much of the North American continent" (Benedict 1979a: 3). He sees the Altithermal not as a single drought but as two short severe droughts, one from 7000 to 6500 B.P. and one from 6000 to 5500 B.P., separated by an episode of increased effective moisture, probably involving late winter and spring precipitation.

Benedict also (1979a: 4) reviewed the Early Archaic sites that were well dated by radiocarbon and noted that there were peak numbers of sites in the mountains 5600 and 7000 years ago with minimum numbers in the plains at 5800 and 6800 years ago. The peaks on the plains occurred at 7300, 6300 and 5300 years ago while the minimums in the mountains were at 7300, 6500 and 5300 years ago. This evidence matches well his postulated drought periods although it would fit better if his earlier drought had been dated about 300 years earlier or between about 7300 and 6800 years ago. A similar but much less dramatic relationship is shown between the number of sites in the Great Basin/Colorado Plateau area and those in the Rocky Mountains, although there was no marked increase after 5700 years ago. This pattern supports Benedict's supposition that there was a movement from the plains into the better watered mountains during the two severe droughts of the Early plains Archaic period, with a

reverse movement as conditions improved.

Mount Albion Complex

The Mount Albion complex is the best known of the Early Archaic complexes of northern Colorado (Benedict and Olson 1978a; Benedict 1979). The two excavated sites, the Hungry Whistler and 5 BL 70, from which most of the information has been derived, are located above timberline at elevations of 3500 and 3465 m, almost on the continental divide northwest of Denver. The complex is also known from surface collections representing 22 additional, nearby, high-altitude sites, and from excavations at four foothill sites just west of Denver: Helmer Ranch (Arnold Withers personal communication to Benedict, 1977), the Wilbur Thomas Shelter (Breternitz 1971), Magic Mountain (Irwin-Williams and Irwin 1966), and the LoDaisKa site (Irwin and Irwin 1959).

The type site for the Mount Albion complex is the Hungry Whistler site (5 BL 67), a hunting and butchering station with an extensive game drive system. Preliminary reports on this site (Benedict 1970a, 1970b) were followed by a final report (Benedict 1978e). The game drive system consisted of a dry-laid low stone wall 85 m long, and 17 small stone cairns arranged in lines apparently connecting "tree islands." At two nearby sites (5 BL 65 and 5 BL 66) game drive systems also included rock-rimmed pits which may have served to conceal the hunters. Most of the excavation at Hungry Whistler was in the butchering area where there was abundant charcoal and hearths in two discrete layers. The lower level produced reliable radiocarbon dates of 5800 ± 125 , 5730 ± 130 , and 5520 ± 190 years B.P. (3850 to 3570 B.C.) (samples I-3267, I-3817 and I-9434). A determination of 5300 ± 130 (3350 B.C.) (sample I-4418) may also date this level, or may contain a mixture of charcoal from the two levels. A fifth date of 4010 ± 90 B.P. (3060 B.C.) (sample I-9777) is from a hearth that had been less disturbed by frost action.

The most abundant projectile points (40) from Hungry Whistler are Mount Albion corner-notched (Benedict 1978a: 47-54). Four examples of stemmed points with concave bases were recovered. Three very fragmentary bases with stems about 10 mm wide were associated with the hearth dated at 4010 B.P. (3060 B.C.) suggesting that by then shafts were considerably smaller. The fourth, with a stem width of 14 mm and sloping shoulders, was associated with the 5300 B.P. (3350 B.C.) sample, which was possibly contaminated. Two other stemmed and shouldered points were found on the surface. Three points recovered are of unique forms.

Other chipped stone artifacts were apparently designed specifically for butchering and/or hide preparation. These include stemmed knives, unifacial knives and scrapers, bifacial knives, perforators, gouges, graters, utilized core nuclei and micro-tools.

Chipping debris, which was quite abundant, consisted almost entirely of flakes detached during resharpening of tools. Milling slab fragments were common on the surface and in the excavation; five handstones were found.

Site 5 BL 70, occupied almost exclusively by people of the Mount Albion complex, apparently had a function very different from the nearby Hungry Whistler hunting/butchering site. The major emphasis at 5 BL 70 was on camping and gathering wild plant foods, as well as on the completion of partially finished chipped stone tools and the repair and replacement of hunting tools (Olson, in Benedict and Olson 1978: 76-117).

Two radiocarbon dates from hearths at the site, 5650 ± 145 and 5350 ± 130 B.P. (3700 and 3400 B.C.) (samples I-3023 and I-4419) date the Mount Albion occupation. A date of 7650 ± 190 B.P. (5700 B.C.) (sample I-3266), on charcoal from a lower hearth-like feature which, however, had no artifacts associated, probably represents a late Paleoindian or very early Archaic occupation. The 27 Mount Albion corner-notched points from the site correspond well with those from Hungry Whistler but show somewhat less secondary use as butchering and hide-processing tools. Four other points, 3 Hog Back corner-notched points and a small triangular side-notched point (found on the surface and in the loose dirt from a rodent hole) apparently related to a much later occupation not otherwise represented at the site. Other chipped stone artifacts assignable to the Mount Albion occupation include: five ovoid knives, an irregular bifacial flake scraper, two irregular unifacial flake knives or scrapers, two backed flake knives or scrapers, an end scraper, a triangular scraper, a perforator, a spokeshave/perforator, two cores and eight micro-tools. Milling slabs were represented by 81 fragments from at least six specimens, mostly from the excavations; striations show a back-and-forth grinding motion. Seven handstones show one or two secondary grinding surfaces intersecting the primary one at 90 to 130°. A great deal of flaking debris was also recovered, primarily from the fabrication rather than the resharpening of stone tools.

High-altitude sites from which surface collections have been made include 22 with Mount Albion complex components. These are located near the continental divide in Rocky Mountain National Park, and just to the south in the Indian Peaks area. At six of these there are game drive structures presumably used by Mount Albion people. At one of these sites (5 BL 147) there are five superposed systems documenting the evolution of game drive hunting techniques in the Front Range (Benedict and Olson 1978: 119-125).

Mount Albion components are identified by Benedict and Olson (1978: 129-132) at several other excavated sites from along the west side of the hogback west of Denver. Such an assignment is sug-

gested on the basis of photographs, provided by C.E. Nelson, of corner-to-side-notched points from Cherry Gulch. The site has a radiocarbon date of 5730 ± 220 B.P. (3780 B.C.) (sample UGa-1230), and was occupied by mountain-oriented people until later prehistoric times. The Helmer Ranch site (K: 12: 2) has similar projectile points and a radiocarbon date of 5780 ± 160 B.P. (3830 B.C.) (sample W-272).

The easternmost known occurrence of the Mount Albion corner-notched points, according to Benedict and Olson (1978: 130-132), is at the Wilbur Thomas shelter, excavated and reported by Breternitz (1971), and discussed in the Middle Archaic section of this work. Mount Albion points were likewise reported from the Willowbrook shelter (Leach 1966), which was also excavated and reported under the name of "L. B. Shelter" by Irwin-Williams and Irwin (1966: 223-225). Some of these points are smaller than the ones from Hungry Whistler. Like the ones from the Van Bibber Creek site (C. Nelson 1969; Figure 3), they appear to be part of the continuing Mountain Archaic tradition, but two to three millennia younger than the Mount Albion complex proper.

There are several other excavated sites from which Mount Albion corner-notched points have been recovered (Benedict and Olson 1978: 126-132). The Ptarmigan site (5 BL 170) is located at an elevation of 3460 m in the Fourth of July valley (Benedict 1974). Artifacts are few and fragmentary, but include the diagnostic points, which are probably associated with charcoal dated at 4620 ± 95 , 4700 ± 95 and 4745 ± 95 B.P. (2670, 2750 and 2795 B.C.) (samples I-8562, I-8563 and I-8280). An older date of 6450 ± 110 B.P. (4500 B.C.) (I-7458) may date a Bitterroot side-notched (Logan Creek) point at this multicomponent site. The corner-notched points appear to be typologically intermediate between those at the type site of Hungry Whistler and those at the most recent site, Coney Lake (5 BL 94), at which points of the Mount Albion complex have been found. The main differences involve a reduced emphasis on basal and notch grinding and a greater use of cryptocrystalline rock.

Albion Boardinghouse Complex

Near the continental divide, some 55 km west of and in view of Denver, are sites attributable to three different Early Archaic populations dating from the 6000-5500 B.P. drought period on the plains. There appears to have been very little interaction among the groups represented. One archeological assemblage is the Albion Boardinghouse complex, near timberline at 3260 m elevation (Benedict 1975c, 1979). A radiocarbon age for this site is 5730 ± 145 B.P. (3780 B.C.) (sample I-5020). Twenty-three dart points of a distinctive form were recovered. These are 3.5 to 4 cm long, up to 1.5 times as long as wide,

are basically triangular with convex unserrated blade edges, deeply concave serrated bases, and narrow, deep side notches about 2/5 of the way up from the base. Point preforms and decortication flakes were found at the site, indicating that the points were made there, probably from chert which occurs just west of the Continental Divide near Kremmling. Other artifacts include thick bifacial knives and flake end scrapers, along with flakes apparently detached during the resharpening of butchering tools. Fragments of burned cobble handstones and a thick sandstone milling slab indicate that plant food was processed locally. The projectile points are of a style apparently restricted to the southern and central Rocky Mountains, but resemble points from Sudden Shelter in southeast Utah (Jennings et al. n.d., cited in Benedict 1979). Such points also occur at Signal Butte in the western Nebraska Panhandle (Strong 1935; Bliss 1950) and at the Scoggin and Pine Spring sites in the Wyoming basin (Sharrock 1966; Lobdell 1973). These sites (Benedict 1979) all date from between 4670 and 3635 years ago, or one to two thousand years later than the Albion Boardinghouse complex, leading Benedict (1979: 6) to suggest that the point style developed in the latter complex and spread north, west and east from the mountains at the end of the Altithermal.

Fourth of July Valley Complex

Another Early Archaic complex, located at high altitudes in the mountains just west of Denver, is the Fourth of July Valley complex (Benedict and Olson 1973; Benedict 1979). The type site, at an altitude of 3415 m, is covered with snow nine or ten months of the year, and was at the edge of a glacier shortly after it was occupied. Two radiocarbon dates from this single-component site are 5880 ± 120 and 6045 ± 120 B.P. (3930 and 4095 B.C.) (samples I-6544 and I-6545). Artifacts from the type site include bifacial knives, a quartzite chopper, two flake graters and a number of flakes detached in resharpening tools. The 19 projectile points and fragments include both lanceolate and stemmed varieties, some showing parallel-oblique flaking and alternate edge retouch. The points are intermediate in size, shape, and technique of manufacture between such late Paleoindian forms as James Allen and Pryor Stemmed points and such Middle Archaic forms as McKean Lanceolate and Duncan points. Benedict (1979: 8) suggests that "the McKean Complex evolved from ancestral Paleo-Indian complexes in Altithermal refuge areas such as the Colorado Front Range, and that its rapid spread onto the western plains, 5500-5000 radiocarbon years ago, was made possible by the beginning of Neoglaciation."

Magic Mountain Complex

Our best information for Early Archaic com-

plexes from along the foothills of the Rocky Mountains comes from the deeply stratified Magic Mountain site just west of Denver, Colorado (Irwin-Williams and Irwin 1966). The Magic Mountain complex, the earliest at this site, began about 3500 B.C. and lasted until sometime after 2500 B.C. A radiocarbon date of 2980 ± 250 B.C. was obtained on a sample from about midway through the time span of this complex. This date also marks the beginning of occupation by people of the Apex culture, an occupation that continued for some two and a half millennia. Presumably people of two groups, quite different in their material culture assemblages, both used the site sporadically.

The Magic Mountain complex has as its diagnostic artifacts four types of projectile points: MM 1, 2, 3 and 4 (Irwin-Williams and Irwin 1966: 67-72).

Although the second and third zones from the bottom at the Magic Mountain site contain a mixture of Magic Mountain complex and Apex complex artifacts, Irwin-Williams and Irwin (1966: 178-179) feel that they can identify artifacts of the earlier (MM) points as being of types that occur in decreasing frequency from bottom to top. Also, they note that Magic Mountain types reflect the generalization that "The basic distinctive technological mode prevailing in the Magic Mountain complex and influencing its component artifacts is that of producing prismatic flakes from prepared sub-conical cores." The complex includes a series of tiny, slightly modified micro-prismatic flakes converted into micro-scrapers, perforators, knives and other tools. Other artifacts include various finely made scraping tools on ends of prismatic flakes, as well as unusual forms: i.e., asymmetrical, extremely convex, narrow-bit, and notched. Also included are specialized unifacial perforators, drills, bifacial perforators, small ovoid bifaces, steep well-made scraper-planes on cores, and several types of bifacial, large, pebble and core choppers. Ground stone artifacts include numerous forms of grinding slabs.

The relationship of the Magic Mountain complex to other sites and complexes is discussed at length by Irwin-Williams and Irwin (1966: 182-190). They have identified seven other sites at which this complex occurs; all are between the type site just west of Denver, Colorado, and the Wyoming line, and lie at altitudes of 1800 to 3500 m. To establish distribution they looked for the distinctive and diagnostic points of type MM 3 in numerous collections, made primarily by amateurs, from all over Colorado. Since MM 3 points represent a very small percentage of the points examined, they feel that this distribution is indeed valid for the complex. Also, their search of the literature failed to disclose the Magic Mountain complex in other areas, although they noted a few similarities between this complex and both Oak Grove material in Oklahoma and Archaic complexes in the Edwards Plateau and Big Bend areas of Texas. Perhaps the greatest resemblance,

and that not strong, is to the Old Cordilleran culture, which extends from western Wyoming north into British Columbia and is apparently considerably older than the Magic Mountain complex. Their conclusion is that the Magic Mountain complex developed in situ in north-central Colorado, with possible influence from one or more directions.

Evidence from the Magic Mountain site is viewed somewhat differently by Benedict and Olson (1978: 127-128) than by Irwin-Williams and Irwin (1966), whose interpretations are summarized in the section of this paper dealing with the Middle plains Archaic. Benedict and Olson point out that the lowest level (F) at Magic Mountain could be contemporary with the Mount Albion complex at Hungry Whistler, since the radiocarbon date for the bottom of the next higher level at Magic Mountain is 4930 B.P. Furthermore, some, but by no means all, of the artifacts in the lowest level at Magic Mountain (assigned to the Magic Mountain complex) are duplicated in the Mount Albion complex, a circumstance which leads Benedict and Olson to interpret the oldest material at Magic Mountain as a mixture of at least two unrelated complexes, one of which is Mount Albion. They also see evidence of an ongoing Mountain Archaic complex until 1500 B.P., with an influx of plains, Great Basin and Southwestern traits rather than a simple replacement (with overlap) of the Magic Mountain complex by the Southwest-affiliated Apex complex.

A burial from Colorado reported by Anderson (1966) is apparently assignable to the Early Archaic or Paleoindian period. The site, 4 LR 99, is located 27 km northwest of Fort Collins, in Larimer County, 32 km south of the Colorado-Wyoming line. A radiocarbon age of 9700 ± 250 years (7750 B.C.) was obtained on collagen from human bone (sample GXO-530); an age of 3540 ± 130 years on the carbonate fraction is considered contaminated and too recent. The bones and associated artifacts were heavily stained with red ocher. The skeleton had been flexed on its left side. The artifacts, unfortunately, are not considered diagnostic. A large bifacially chipped blade and two small blades (one burned) are thought to be preforms but do not resemble Folsom preforms. Other artifacts include a smooth stone (pecked to size and ground to shape), a hammerstone, a broken end scraper, three utilized flakes, two small cut mammal ribs, a perforated elk tooth, seven unperforated elk teeth, and a grooved rodent tooth. The overall evidence suggests that an Early Archaic rather than a Paleoindian assignment is more probable.

Other Early Archaic Sites

In the foothills of the Rocky Mountains to the north and west of Trinidad, near the southern border of Colorado, are nine sites, located by survey,

which Lutz and Hunt (1979: 133) attributed to the Early Archaic period. It is not obvious why five of these sites were so assigned, since apparently only four yielded diagnostic points, one point per site.

In his recent review of Archaic sites in the panhandles of Texas and Oklahoma and in the western third of Oklahoma, Baugh (1982: 34-37) makes the point that most such sites are of the Early Archaic period. As for the Central High Plains, he reports only the Kenton Caves, Nall, Johnson-Cline and Shaller sites and bases most of his summary on sites farther south and southeast, drawing on the reports of others: Sellards, Evans and Meade (1947); Willey, Harrison and Hughes (1978); Harrison and Killen (1978); Hester, Lundelius and Fryxell (1972); Johnson and Holliday (1980); Saunders and Penman (1979); Baker, Campbell and Evans (1957); Bell (1954); Burton and Burton (1971); Hofman (1971); and Lintz (1978b). Of special interest is the human skeleton from the Gore Pit site located about 150 km southeast of what we are calling the Central High Plains. The skeleton was deeply buried under alluvium and dated at $7100 \pm$ B.P. or 5150 B.C. (Baugh 1982: 36; Hammatt 1976; Keith and Snow 1976). With the occurrence of well-flaked lanceolate points characteristic of the Early Archaic period at camp and bison kill sites in adjoining areas, the complexes represented could be expected to occur throughout the southeastern part of the Central High Plains. These complexes appear to have their closest cultural relationships to the southeast.

At the Johnson-Cline site, in Texas County, Oklahoma (the middle county in the Oklahoma Panhandle) an Early Archaic occupation is represented by four projectile points, two Palmillas points and two of unnamed types (Lintz 1978b). Lintz concluded that the paucity of Early Archaic points at the site suggested that (1) the site was not intensively utilized in Early Archaic times, (2) the activities were such that few points were left, or (3) the points were reused and left by later people at this multicomponent upland dune site. Palmillas points are described by Bell (1960: 74).

Baugh (1982: 36) sees complexes of "corner-notched and side-notched spear points, a few grinding stones and grinding basins, and several chipped stone scrapers, gouges, and knives" at several sites in northwestern Texas and western Oklahoma. These sites include 34 GR 12, Duncan-Wilson shelter, Johnson-Cline, Shaller, Ross, 24 CD 177, and 34 GR 3 (Leonhardy 1966: 17-32; Burton and Burton 1971: 5-8; Hofman 1971, 1973, 1978b; Lawton 1968; Lintz 1978b).

MIDDLE ARCHAIC

McKean Complex

The best known complex of the Middle Archaic period is the McKean, named for the McKean site in

the northeast corner of Wyoming (Mulloy 1954) and extending at least as far south as northeastern Colorado (Irwin and Irwin 1959: 135-138; Luebbers 1971: 69-74). Frison (1978: 46-50), concerned mainly with the northwest plains, where the McKean complex centers, includes a series of 25 radiocarbon dates for the Middle Archaic ranging from 3000 B.C. to 500 B.C. (5000 to 2500 B.P.) and presents a concise discussion of McKean which is here summarized.

Frison sees the McKean complex as representing a sudden appearance of people both on the open plains and in the intermountain basins, areas previously little inhabited. McKean people were more dependent on plant food than earlier populations, as evidenced by the first appearance of true manos and grinding slabs, and roasting pits. The latter varied considerably in size and shape; some pits were lined with stone slabs, and many had been used repeatedly. Such pits are widespread, and in the plains their use continued for thousands of years, well into the Historic period. In addition to an apparent increase in the utilization of vegetal foods, hunting of large game continued. Perhaps economic activities were seasonal.

In spite of the great variability of projectile points in the McKean complex, they are still the most diagnostic artifacts. Mulloy (1954: 444) recognized the variation, but concluded that "all variants appear so closely connected by intergrades that the writer prefers to regard them as variants of a single norm." The full range has been found at sites other than McKean, but at some sites, such as bison kills, only one variant has been recovered. Some of the variants have been described as separate types, McKean Lanceolate, Duncan and Hanna, by Wheeler (1952, 1954). Some points have long, shallow, lateral constrictions and others have true side notches. Bases may be concave, deeply indented or have true basal notches. A variant of McKean Lanceolate is a large heart-shaped variety. Rarely are stems or blade edges ground. Another form, also found in Level 1 at Signal Butte in the western panhandle of Nebraska, and named "the Mallory Point" by Forbis, is "wide, very thin, with deep side notches placed well forward, and with either straight, slightly concave, or deeply indented base. Sometimes the addition of a deep, narrow basal notch is seen" (Frison 1978: 50). Points range in length from 1.5 to 7 cm. Duncan and Hanna points are reported by Perino (1971: 26, 44) from Saskatchewan and Alberta in Canada and from the states of Montana, the Dakotas, Wyoming, Colorado, Kansas, Nebraska, and Oklahoma. The Duncan points Perino illustrates are from Morgan and Weld Counties, Colorado and two of the Hanna points he illustrates are from Morgan and Carbon Counties, Colorado. Bell (1958: 50) indicates that McKean Lanceolate points are found over much of the western United States, not just Montana, Wyoming, South Dakota and Nebraska as indicated by

Wheeler (1952).

Lister (1953: 264-265) suggested that stemmed, indented-base points might be a time marker in the western United States. In addition to the points from the McKean site, he includes in this category such named types as Pinto points, Rio Grande points, Pedernales Indented and Brazos River types, and adds to their area of distribution California, Arizona, Utah, Montana, Nevada, Colorado, New Mexico and Texas. However, his suggested horizon, between Folsom and recent, is quite broad.

Other chipped stone artifacts reported by Mulloy (1954) from the type site include plano-convex snub-nosed end scrapers; spokeshaves (for dressing shafts upwards of 19 mm in diameter); bifacially chipped knives; crude, percussion-flaked cores; and flake scrapers or knives. One complete metate from the lower level of the site consisted of a sandstone slab clearly roughened by pecking on each face, although only one face had been used; a longitudinal trough showed the results of grinding with a mano in a reciprocating manner. Manos and fragments of metates, all of the same type, were much more common in the upper level than in the lower. A bone awl and a fragment of a grooved maul were also found in the upper level. Worked *Unio* shell was common in the lower, but absent from the upper, level. Hearths were common in both levels. Some were unprepared with fires having been built on the ground surface. Others consisted of pits--hemispherical, straight-sided or irregular -- and unlined or lined with stones. Most were small, but one was over 1.5 m in diameter. Two probable storage pits were also found.

Frison (1978: 51) attributes some of the numerous stone circles or tipi rings commonly found in the Plains to Middle and Late Archaic peoples as well as to later populations. Since artifacts are rare at such rings, which probably represent the locations of otherwise perishable structures, there is apparently no way to establish age for most such sites.

At the LoDaisKa site, a rock shelter just southwest of Denver, Colorado, Cultural Complex C resembles the McKean and Signal Butte I complexes (Irwin and Irwin 1959: 135-140). The identification of this complex is based primarily on artifact typology, since there had been mixing of the various cultural levels. The most numerous points (24) at LoDaisKa are shouldered, concave-base, stemmed dart points which Irwin and Irwin (1959: 22-24, 136) call "Type A" and identify as Duncan points. Two of these (their type A2) could probably be better identified as Hanna points since they have expanding stems with concave bases. They also point out that the largest LoDaisKa points resemble, and are equal in length to, the smallest McKean Lanceolate points from the type site, but correspond more closely to points from Signal Butte I. End scrapers are also assigned to Complex C. Prismatic flakes modified into graters, cutting tools and possibly scrapers, and all pre-

sumably struck from prepared cores, constitute another trait shared with McKean, although these flakes, too, are larger at the type site. Also found in the same levels as Complex C were milling slabs and rock-filled hearths. Other artifacts which may have been associated with this complex are: leaf-shaped and triangular knives; end-and-side scrapers, discoidal and serrated scrapers, an expanded base drill, perforators, ovoid bifaces, utilized flakes, chopper/hammerstones, a tubular bone bead, paint stones, bone awls, both headed and splinter, and a bone knife.

On the basis of radiocarbon determinations, LoDaisKa Complex C has been dated at 1600 to 1000 B.C. (3550 to 1450 B.P.) (Irwin and Irwin 1961; Irwin-Williams and Irwin 1966: 216). Such a date fits well with those for late McKean complex and the last third of the Middle Plains Archaic as defined by Frison (1978: 83).

At the Wilbur Thomas shelter straight north of Denver, Colorado, almost on the Wyoming line, both upper and lower McKean complexes were identified on the basis of typology. Mixing, however, was such that Woodland artifacts were found even in the lower McKean level (Luebbers 1971: 69-74). Six points attributed to the lower McKean complex conform nicely to the description of Duncan points, but those attributed to the upper-level McKean complex show considerable variety, including one Hanna point, two corner-notched points, and three unnotched specimens. Other chipped stone artifacts included scrapers, graver/scrapers, perforators, bifacially chipped oval knives, and choppers. A mano was found, but no metates.

The Spring Gulch site (5 LR 252) is northwest of Fort Collins, Colorado, and nearly on the Wyoming border. The lower levels of Locality I produced points of the Duncan, Hanna and McKean Lanceolate types (Kainer 1974) along with large corner-notched and side-notched points probably attributable to Plains Archaic. The upper levels showed evidence of Woodland occupation and various non-diagnostic artifacts were found throughout the deposit (Kainer 1974).

LoDaisKa Complex D

The earliest Archaic complex at the LoDaisKa rock shelter has been designated Complex D and dates from 3000 B.C. to 1500 B.C. (5000 to 3500 B.P.) (Irwin and Irwin 1959, 1961), a time span which places it at the beginning of the Middle Plains Archaic period. Complex D is represented in reasonably pure form in the lower meter of the deposit, and mixed, in decreasing proportion, with Complex C artifacts in the next higher 0.6 m. The apparent mixing may be mechanical, representing disturbance of the fill by the most recent occupants, or it may represent use by two culturally distinct groups over a period of years.

Complex D is considered by the Irwins to be most closely related to the Desert Culture, found throughout the Great Basin, but perhaps best known from work at Danger Cave in extreme western Utah (Jennings 1957). Similarities also exist between Complex D, materials from Ventana Cave in extreme southern Arizona (Haurly 1950), and the Uncompahgre complex of southwestern Colorado (Wormington and Lister 1956).

The projectile points from Complex D suggesting the strongest connection with the Desert Culture are those Irwin and Irwin (1959: 22, 141) designate as Class D points and describe as follows: "Blade triangular, length three to four times the width, edge sinuous; tapering from barb to center, expanding toward point, then tapering off; stem expanding, narrower than blade, base concave or straight."

Other traits which Irwin and Irwin (1959: 140) attribute to Complex D include: triangular chipped stone knives, a few flake knives, a variety of scrapers-side, discoidal, Uncompahgre, and (rarely) end scrapers. Also present are drills, perforators, utilized flakes, choppers, hammerstones, paint stones, bone awls (both splinter forms and ones with heads, especially some very large forms), a notched rib, used bone splinters, antler flakers, undecorated gaming pieces, tubular bone beads, a tooth pendant, a limestone pendant, worked mica, one quartz ball, and one clay ball. Many of these traits are shared with the Danger Cave assemblage, as are one-hand manos and slab milling stones. A four-plane mano attributed to Complex D is not reported from Danger Cave and the reverse holds for abrading stones.

Apex Complex

The Apex complex, a Middle Archaic complex with southwestern roots found at the Magic Mountain site (Irwin-Williams and Irwin 1966: 216 ff), is dated at about 3000 B.C. (5000 B.P.) to about 500 B.C. (2500 B.P.). The traits diagnostic of Apex are the projectile points, which increase in frequency as one goes up through three zones, starting with the next to the bottom zone, at the Magic Mountain site. Within the Apex complex some traits are consistent through time while others exhibit stylistic variation and reflect temporal development (Irwin-Williams and Irwin 1966: 72-89, 190-193).

Limited information on Apex burials (Irwin-Williams and Irwin 1966: 196) suggests that graves were located in living areas, contained small amounts of utilitarian goods, and were covered with cairns of medium size stones, including milling slabs. Many bones are missing, suggesting possible secondary burial.

The relationships of the Apex complex beyond the Magic Mountain site are discussed in detail by Irwin-Williams and Irwin (1966: 196-205). Their conclusion is that this component is the extreme northeastern manifestation of the complex ances-

tral to Pueblo cultures, called the "Elementary Southwestern Culture," by Daifuku (1952) and the Picoso Culture by Irwin-Williams (1967). There is little evidence of interaction between the Apex people and those of Complex D at LoDaisKa, 10 km away, even though they overlap in time for about 1500 years. The two complexes had a few similar artifacts, but these were of such a general nature that there is no need to suggest interaction. Occupation of both sites was intermittent during the long time period indicated, and it is quite possible that the two groups exploited the Denver basin according to such different patterns that intergroup contact was rare. The same can probably be said about people of the Magic Mountain complex and the Apex complex, both of whom utilized the Magic Mountain site intermittently for some 500 to 800 years. Furthermore, Irwin-Williams and Irwin saw no evidence of interaction between the Apex people and the Late McKean complex people who were their neighbors at the LoDaisKa site for 500 years following the Complex D occupation of the site.

As mentioned earlier, Benedict and Olson (1978: 127-129) do not interpret the evidence from Magic Mountain and LoDaisKa as showing this degree of uniqueness and isolation, but see long, on-going use by people following a Mountain Archaic tradition, beginning with visits of Mount Albion complex people as early as 4840 B.P. (2890 B.C.) and showing influence from various directions.

Picoso Culture

The Central High Plains area is on the extreme eastern edge of the northern sector of the Picoso culture as defined by Irwin-Williams (1967). The Picoso culture, essentially synonymous with the "Elementary Southwestern Culture" as defined by Daifuku (1952), is seen as a Middle Archaic complex, with three regional variants, that gave rise to the various Pueblo traditions. As mentioned, Irwin-Williams and Irwin (1966: 196-205) suggest that the Apex culture found in the Denver area is the northeasternmost manifestation of the Picoso culture.

Irwin-Williams (1967: 442-444) characterizes the Picoso culture as representing a sparse population that exploited seasonal food resources by making a "seasonal round," in the course of which they returned sporadically or regularly to specific sites, including rock shelters, where the deposits demonstrate repeated reoccupation. In addition to hunting and gathering, subsistence activities included simple horticulture, which became increasingly important. Characteristic artifacts include flake side scrapers, thicker end scrapers, flat or shallow basin milling slabs, handstones, bone awls, coiled baskets and various other artifacts of perishable materials not commonly found in the plains. Chipped stone projectile points show regional and temporal variation, but are dominated by stemmed, indented-base types.

The only complex within the Central High Plains assigned to the Picoso culture by Irwin-Williams (1967) is the Apex culture, previously discussed. However, there are sites in Colorado with related manifestations located in the San Luis Valley, in Sand Dunes National Monument, near Saguache, and in the mountains west of Trinidad (Swancara 1955; Huscher 1941). The sites in the San Luis Valley are at essentially the northern end of Renaud's (1942) Upper Rio Grande complex, which is also subsumed as part of the Picoso culture.

Farther south, in northeastern New Mexico, Glasow (1980: 71) identified only two sites as Archaic out of the 300 sites he found in the canyons of the Sangre de Cristo Mountains near Cimarron. Of these sites he states:

Only slightly more evidence exists for Archaic [than Paleoindian] occupation in the Cimarron district. This comes from a rock shelter in Cimarron Canyon at the mouth of Bear Canyon (site no. CI-42), and from another probable shelter in Middle Ponil Canyon at the mouth of Horse Canyon (MP-17) . . . [about eight miles west and ten miles [13-16 km] northwest of Cimarron, respectively]. From the lower levels of the test pit in the apron of midden debris in front of the Bear Canyon shelter, below ceramic-bearing levels came a collection of comparatively large, often heavily patinated hornfels and basalt chipped-stone tools in association with large projectile points. Projectile points of the same size and form have also come from an eroded bank next to a road cut in front of the Horse Canyon shelter, in association with sparse lithics which include an alibates chert "tear-drop" endscraper. The several projectile points (or fragments) from these two sites are similar in size and form to the straight-stemmed, indented-based points described by Irwin-Williams as being predominant during the late Archaic in the northern sector of the Southwest (Irwin-Williams 1967: 452). Other forms of large projectile points have also been reported by residents of Cimarron, including several from site MP-19. However, the general impression is that Archaic occupation was sparse in the Cimarron district.

At high elevations, about 3,350 m, in the southern Sangre de Cristo mountains immediately to the west of the southwest corner of our study area, Wendorf and Miller (1959) report eight Archaic sites. Although there is evidence of limited Pueblo use of the high area about A.D. 1500, presumably for hunting, the main use was apparently by Archaic peoples. "Over half of the identifiable projectile points are . . . thin, leaf-shaped blades with deep, diagonal corner notches." These were predominant at five of the eight sites and are similar to points from near Tesuque, New Mexico, dated by radiocarbon at 2330 ±

250 years ago. Other points from the high-altitude sites are seen by Wendorf and Miller (1959: 48) as resembling ones from near Santa Ana Pueblo dated by radiocarbon at between 2180 ± 250 B.C. and 3300 ± 700 B.C. (Agogino and Hibben 1958). Many of the points from the high-altitude sites have notched or bifurcated bases and are said to resemble ones reported by Renaud (1942) from the Upper Rio Grande near the New Mexico-Colorado line. A large, heavy stemmed point from the easternmost part of the site is considered unique by Wendorf and Miller (1959: 50), who suggest that its origin may lie to the east.

Other Middle Archaic Sites

A hunting blind connected with Archaic game procurement was the most probable function of a rock ring 2 m in diameter reported at the Blue Lake Valley site (5 BL 141) about 48 km northwest of Denver, Colorado, at an elevation of 3370 m (Benedict 1979b). Associated with the ring, which had apparently served to conceal hunters along a game drive, were flakes left from tool resharpening. A projectile point found on the surface 3 m away was probably associated with the ring, and is similar to ones from Porcupine Peak site (5 ST 98) in Summit County, west of Denver, Colorado, and also to ones from the Medicine Lodge Creek site, north-central Wyoming (Frison 1978: Figure 5.40 h, i) where they have been dated at 3020 ± 140 B.P. and 3110 ± 170 B.P. (1070 and 1160 B.C.) (samples RL-96 and RL-559). A wood charcoal sample from near the center of the rock ring at the Blue Lake Valley site gave a date of 3215 ± 90 B.P. (1265 B.C.) (sample I- 8281).

Moomaw (1954) speculated that stone walls found near timberline in the Rocky Mountains might have been connected with game drives, but rejected the idea because he thought there would be better locations than many chosen. He also suggested that Indians might have resorted to hunting in the mountains when drought on the plains made hunting there unprofitable.

Occupation from at least the Middle Archaic on is documented in the 1.9 m of deposit in Draper Cave (5 CR 1) (Hagar 1976). The cave, at an elevation of 2,000 m, is on a southern tributary of the Arkansas River, about 40 km straight west of Pueblo, south-central Colorado. Radiocarbon dated samples from depths of 71 and 126 cm were 3520 ± 70 and 3480 ± 65 B.P. (1570 and 1530 B.C.) (samples UGa-736 and UGa-737). Included in the substantial collection of projectile points from the site is a variety of Archaic points. Some are stemmed, with expanding or parallel-sided stems; others are corner-notched; some have concave bases. There are specimens with straight, convex, or serrated blade edges. Stems and bases may be ground or unground, and point length ranges up to 6 cm. The McKean complex is well represented by variants of Duncan points, but a ma-

jority of the points would be assignable to Benedict's Mountain complex. Two cobble-lined hearths and one lined with slabs were found, in addition to numerous concentrations of charcoal not in prepared hearths. A semi-flexed burial, 1 m deep, was accompanied by 38 leaf-shaped chert knives up to 10 cm long. There was a prepared hearth 20 cm directly above the top of the burial pit and 60 cm below the surface that established the burial as belonging to an Archaic occupation. Some of the projectile points could be of Woodland authorship, but no pottery was reported. Block metates and fragments were common; some were extensively used. The human skeleton, which was poorly preserved, was described by Finnegan (1976). He compares the Draper Cave skeleton with one of about the same radiocarbon age from the Witkin Burial site (Swedlund and Goodman 1966), and to the Woodland/Archaic(?) skeleton from site 14 TO 301 in Trego County, west-central Kansas (Finnegan 1974). He finds these Plains Archaic skeletons "comparable" to ones from a series of Archaic skeletons found in Alabama, but draws no conclusions as to possible relationships (Finnegan 1976: 28-29). A chemical analysis of the deposits at Draper Cave is presented by Kane (1976) and the flora was analyzed by Lyons (1976).

Two other sites in Colorado, better known for their Paleoindian components, have remains of Archaic occupations in their upper levels. The Lindenmeier site, famous for the Folsom camp, also has an Archaic component dated at 3065 B.C. (5015 B.P.) (Haynes and Agogino 1960: 20-21). Wedel and Metcalf (1962) and Wedel (1963) report material of similar age from the Lamb Spring site just south of Denver, Colorado.

In the foothills of the Rocky Mountains to the west and north of Trinidad, in extreme southern Colorado, are 14 sites and two isolated finds attributed by Lutz and Hunt (1979: 133) to the Middle Archaic period. Each site or find yielded a single diagnostic artifact assignable to one of seven types. The projectile point descriptions are by Lutz and Hunt (1979: 102-103, 127).

On the Chaquaqua Plateau, in southern Colorado just north of the New Mexico line, and about halfway between the Rocky Mountain foothills and the Kansas line, Campbell (1976: 49) reports finding evidence of Early Archaic components at seven sites. Five of them also contained later material, while one contained earlier. In terms of the time periods being used in this study, Campbell's Early Archaic components could better be classified as Middle Archaic. Points represented are assignable to three large stemmed types, Trinity, Pandale and Travis, all of which are found in Texas and the latter two in Oklahoma. Leaf-shaped points identified as of the unnotched Abasolo type may have served as knives. The known distribution of these is in Texas and New Mexico (Bell 1958). Other artifacts from these sites include: bifacially flaked blades and ovates, small

rectangular side scrapers, utilized blades and asymmetrical flakes, unperformed mortars, one hand unifacial loaf manos, polishers, hammerstones, and bone awls. Most of the sites were surface camps in upper parts of canyons.

In western Oklahoma and the panhandle of Texas there are fewer known Middle Archaic sites than Early Archaic sites in spite of the fact that the earlier period was probably less hospitable climatically (Baugh 1982: 36; Dillehay 1974: 185-187).

LATE ARCHAIC

Frison's (1978: 56-62) review of the Late Archaic in the northwestern plains is relevant to our study. At about 1000 B.C., according to this authority, the points of the McKean complex gave way to large corner-notched or expanding stemmed points such as those of the Pelican Lake type. These have straight to slightly convex blade margins and straight to convex bases. The marked corner notches meet the blade margins at angles ranging from definitely acute to ones approaching 90. Length typically is between 3 and 6 cm with widths ranging from 1/3 to 2/3 the length, the shorter points being the relatively broader ones (Perino 1971: 72). On the basis of a series of 24 radiocarbon dates, Frison dates the Late Archaic in the northwest plains at 1000 B.C. to A.D. 500 (about 3000 to 1500 B.P.).

Magic Mountain Complex B

Following the Late Apex complex at Magic Mountain was Zone B, with contents designated as Complex B, which lasted from about 500 B.C. until about A.D. 800 (2500 to 1150 B.P.). Occupation was much less intensive and only 13 projectile points were recovered. Complex B is most similar to late preceramic Basketmaker complexes in the Southwest and can probably be best interpreted as reflecting greatly reduced use of the site by descendants of Apex complex people.

Salvage archeology at site 5 JF 10 on Van Bibber Creek near Golden, just west of Denver, disclosed an Archaic occupation there (Nelson 1969). Six projectile points with expanding stems, lateral or corner notches, and straight to convex blade edges, as well as three end scrapers were recovered from Zone C. A radio-carbon determination on a sample from this zone provided a date of 190 ± 250 B.C. (2140 B.P.). Four of the six points resemble type MM 20 from Magic Mountain, which is attributed to the Apex complex and continues into Zone B (Complex B). The radiocarbon date of 190 B.C. (2140 B.P.) falls in the early part of the range for Complex B (Irwin-Williams and Irwin 1966: 216).

Other Late Archaic Sites in Colorado

An Archaic occupation level was found at the

Willowbrook site (5 JF 6), a stratified rock shelter near Morrison, south-southwest of Denver, Colorado (Leach 1966). Level 3, which is characterized by the presence of Archaic projectile points, was dated at 2215 ± 75 years B.P. (265 B.C.) on the basis of a charcoal sample contaminated with small rootlets and moisture. The next lower level, which yielded no diagnostic artifacts, was dated at 2040 B.P. (90 B.C.) on the basis of similar samples. This apparent reversal suggests that the two levels are essentially the same age. Two hearths, both outlined with rocks, were found in the Archaic level. One had a maximum diameter of 36 cm and a depth of 10 cm; the other had a maximum diameter of 89 cm and a depth of 36 cm. The 10 projectile points from this level are small to medium sized, rather crudely made, with expanding stems. Leach classifies them as "side-notched" but except for one aberrant point, they could be better described as corner-notched. Other chipped stone artifacts include four more or less triangular crude blades and a crude scraper; manos, 10 cm or so in diameter, are essentially round, some having been used on one surface and some on two. Metates are shallow milling slabs with a shallow oval depression on only one surface: there was no evidence of pecking. Ceramics, absent from the Archaic level, occur in the upper level where they are attributed to a Woodland occupation. Also found along with Woodland points in the upper level are specimens that Leach considers Duncan-Hanna and McKean points.

According to preliminary reports of excavations, sites 5 JF 12, 5 JF 51 and 5 JF 52, near Denver, Colorado, have Archaic components, but no basis for such an assignment is given (Medina 1974; Richardson 1974; Stieghorst and Bennett 1973).

In his reports of surveys in the potential Two Forks Reservoir area, some 48 km southwest of Denver, Colorado, Windmiller (1974a, 1974b, 1975) reports at least eight sites showing evidence of Archaic occupation. Precise identification of complexes was not determined, but the sites are thought to include both Early and Late Archaic manifestations.

A burial of Archaic age was found during construction in southeast Denver at the Witkin Burial site (5 AH 6) (Swedlund and Goodman 1966). The burial was in a flexed, semi-sitting position in a pit. It was accompanied by two chipped stone blades, each about 7 cm long and generally oval, a scraper or smoothing tool made from part of a deer skull, and a grooved and split deer metapodial. A radiocarbon date of 1240 ± 80 B.C. (3190 B.P.) (sample GXO-725) obtained for a sample of human bone is too early for the burial to have had Woodland affiliations, even though other evidence would permit such an assignment.

The Running Pit House site, located about 13 km west of Trinidad, about 8 km up a north tributary of the Purgatoire River in extreme southern Colorado,

was excavated in 1954 by Dick (1974). The structure consisted of four connected pits, more or less circular, and a "bench" adjacent to three of them. Perhaps no more than two rooms were occupied at any one time since two of the rooms appeared to have been deliberately filled. The entire structure, very irregular in outline, measures about 6 x 12 m and the pits were about 1 m deep. Twelve posts, in no particular pattern, were found in the rooms and on the benches; many of the posts had been propped up rather than set in holes.

Other artifacts included drills with expanded bases; triangular and elliptical bifacial knives; scrapers; graters; metates with a trough, basin, or flat grinding surface; manos; worked graphite; a stone pendant; bone heads made from deer phalanges or long bones of small mammals; bone splinter awls and worked shell.

No pottery was found at this site, but the pit house and the resemblance of the points to those from Basketmaker sites in New Mexico suggest some sort of relationship with Basketmaker complexes. A date of A.D. 100 to 400 seems reasonable.

A survey in the foothills of the Rocky Mountains in extreme southern Colorado revealed 17 sites that may be related to Basketmaker complexes in New Mexico and Arizona (Lutz and Hunt 1979: 133). The relationship seems to be postulated solely on the basis of four point types.

About 65 km east of Trinidad, Colorado, is Trincheras Cave, which has received the attention of various archeologists, most of whom worked out of Trinidad State Junior College (Wood-Simpson 1976). Her report, however, is based on her excavation in 1974 and does not incorporate the results of earlier work. The oldest levels at Trincheras yielded large corner-notched points similar to Ellis points of Texas, and also to points of the assemblage found in Zone B at the Magic Mountain site near Denver. These lower levels at Trincheras are of late Archaic age.

On the Chaquagua Plateau, in southeastern Colorado, Campbell (1976: 49) found Late Archaic materials at ten sites of which he excavated three. The diagnostic points are mainly small to medium, with expanding stems or corner notches, and are assignable to Yarbrough, Ellis, Edgewood, Palmillas and Marcos types. Also found were Shumla points, which are medium sized with edges and stems more or less straight, and with barbs. All of these types have been reported from Texas and Oklahoma (Bell 1958; 1960). All the points are of a size that indicates the use of an atlatl or spear. Other artifacts include: bifacial flake triangulates and blades, utilized ovate and asymmetrical flakes, small triangular side scrapers, one-face loaf manos, biface manos, shell beads and bone beads. Most of the sites were found in the canyons and some of the sites were rock shelters. Bones of both small and large mammals were recovered, with small mammals predominating. Oli-

vella shells indicate trade to the west.

Little Sunday Complex

Although many Archaic sites exist in the Texas Panhandle and contiguous portions of adjoining states, there has been little systematic concern locally with problems of the Archaic period. Hughes (1976), in a thorough review (reprinted in 1978), suggested that most of the Archaic sites in the area probably date from Late Archaic times. And on the basis of his work at the Little Sunday site, about 25 km east of Canyon, Texas, just south of what we are defining as the Central High Plains, Hughes has proposed a Little Sunday complex. Undoubtedly, additional work will provide the basis for defining additional complexes, but, for now, our purposes will be best served by quoting extensively from Hughes (1976):

Reviews. Archaeological work in the Panhandle, or in the Llano Estacado portion of it, has been reviewed at intervals through the years by various writers, including Krieger (1946), Suhm et al. (1954), Kelley (1964), Hughes (1968), Collins (1971), and Hughes and Willey (in press). These reviews have been able to record very little progress for investigations of the Archaic, since what little work has been done remains largely unpublished.

Surveys. During more than half a century, beginning after his work as a student with Eyerly (1907) at the Wolf Creek Ruins, the late Floyd V. Studer (1931a, 1931b, 1955) recorded scores of sites in the Panhandle, including dozens of Archaic sites. In his archaeological survey of Texas, Sayles (1935) recorded a number of sites in the Panhandle, including some Archaic sites. The survey initiated by Studer was continued beginning in 1952 by Hughes for the Panhandle-Plains Historical Museum, and beginning in 1968 by Harrison for the Museum and by Hughes for West Texas State University. More than 1,000 sites have been recorded, including hundreds of Archaic sites.

During the last two decades, scores of Archaic sites have been revealed by an increasing number of reservoir and other special surveys, as reported by Hughes (1959), [W.] Davis (1962), Moore (1966), Sharp (1969), Malone (1970), Hughes (1973a), Hughes and Willey (in press), Marmaduke (in preparation), Hughes et al. (1974), Guffee and Hughes (1974), Hughes and Hood (1975), Katz and Katz (in press) [1976], and Willey and Hughes (1975).

These surveys indicate that Archaic campsites occur mainly on the rims and terraces of playas, valleys, and canyons, especially the latter, and that some of the deepest and richest sites occur at water sources near canyon heads. Many more sites have been recorded in the

canyons and breaks of the Red River drainage, and in the Canadian breaks, than along the valleys and around the playas on the High Plains. The campsites are usually marked by quantities of hearth stones and boiling pebbles, and often possess rock hearths of various kinds. Bedrock mortar holes are sometimes associated with the sites, especially in the Palo Duro and tributary canyons and in the Canadian breaks. Sites that appear to be later are characterized mainly by corner-indented and corner-notched dart points, ovate to triangular knives, thick end scrapers, small manos, and thin grinding slabs. Although influences from various directions are discernible, affiliations may lie mainly northward. Seemingly earlier sites are characterized by limited numbers of variable dart points, and an abundance of Clear Fork gouges, choppers, and hammers. The gouges are much more common in the Red River breaks than elsewhere in the Panhandle.

Open Camps. Several open campsites with Archaic components have been investigated by Hughes (1955[a]), Green (1967), Thompson (in preparation), Hughes (in preparation, b), Pearson (1974, in preparation), Wedel (1975 [a]), and Hughes and Willey (in press [1978]). Except for Green's site, which is on the Canadian, all of the sites are in Palo Duro and tributary canyons. All of the Archaic components appear to be late or transitional into Neo-Indian, although the sites of Thompson, Pearson (in preparation), and Wedel are deeply stratified. On the basis of a site on Little Sunday Canyon, Hughes (1955[a]) proposed a Little Sunday complex. Until more of the reports are completed and published, little else can be said about these sites.

Rock Shelters. A few rock shelters with Archaic components have been explored by Hughes (in preparation, a), Hughes (in press), Harrison (in preparation), and Hughes and Willey (in press [1978]). Tests have indicated the presence of Archaic components at several other shelters. As with the open camps, most of the rock shelters are in the Palo Duro Canyon complex, and the Archaic components appear to be late or transitional into Neo-Indian. Most rock shelters in the Panhandle do not appear to be much older geologically than the Neo-Indian stage.

Bison Kills. Investigations at several Archaic bison kills have been reported by Tunnell and Hughes (1955), Collins (1968), and D. Hughes (in preparation [1977?]). More than a dozen of the kills have been recorded, three have been tested, and one has been excavated. Most of the kills are in the Red River breaks and are very similar in character. The animals appear to

have been trapped in large numbers at the heads of arroyos, slain with a distinctive type of broad-bladed, broad-stemmed dart point (Fig. 2), and only partially dismembered. The kills appear to have occurred near the end of the last major episode of arroyo-cutting before the present one, and the points resemble specimens from Bonfire Shelter that have been dated at about 2645 B.P. (Dibble and Lorrain 1968).

Flint Quarries. The famous Alibates quarries, although exploited mainly during the Neo-Indian stage, were also utilized during the earlier stages. The Alibates material is an agate of Permian age. Although little investigated, these quarries have amassed a substantial literature, including Bryan (1950), Green [J.] (1955), Shaeffer (1958), Hertner (1963, 1964), Mewhinney (1965), Kendrick (1966), Hughes (1973b and 1974), Bousman (1974), and Hughes and Taylor (1975). Thanks mainly to the efforts of Studer and Hertner, the Alibates quarries and nearby ruins became a national monument in 1966--the only one in Texas, and the only one of its kind in the nation. In Alibates National Monument and the adjoining Lake Meredith Recreation Area, the National Park Service has recorded and is protecting hundreds of sites, including many Archaic sites.

The Tecovas quarries, although less well known, were also much exploited, especially during the Archaic stage along the Prairie Dog Town Fork of Red River and its tributaries. The Tecovas material is a jasper of Triassic age. Also little investigated, these quarries--and other flint sources in the Panhandle--have been treated by Hughes (1955[a]), Green and Kelley (1960), and in various subsequent reports by Hughes and others. Fortunately, several of the Tecovas quarries are located in or near Palo Duro Canyon State Park and the new Caprock Canyons (Lake Theo) State Park.

Flint Caches. A good many flint caches, some of which may be Archaic, have been discovered in and around the Panhandle, and a few these have been reported by Witte (1942) and [J.] Green (1955).

Rock Art. Since the pioneer work of Whipple (1865), rock art sites in the Panhandle have been described by [A.] Jackson (1938), Kirkland (1942), Kirkland and Newcomb (1967), and Upshaw (1972). Rock art is not common in the Panhandle, and most of it appears to be post-Archaic.

Burials. Possible Archaic burials have been reported by Witte (1947, 1955), Tunnell (1964), and Jokerst (1972). Many burials of probable Archaic age have been investigated but have not been reported. Generally in or near camp-

sites, the skeletons are usually flexed in small shallow oval graves, and are often covered with grinding slabs. Other accompaniments are rare. The skulls are usually long.

Miscellaneous. Local occurrences of various artifacts, some of which may be Archaic, have been reported by Wright (1940), Hesse (1943), [J.] Green (1955), Carter (1959), and others. Space-time distributional studies of many types of Archaic artifacts and features are much needed.

Archaeological research on the Archaic stage in the Texas Panhandle has not yet produced an adequate cultural-chronological foundation on which to construct a towering processual edifice of the kind now fashionable in some areas. What seems to be most needed for now is a lot more old-fashioned writing and digging, probably in that order.

Two archaic sites which have been excavated and reported just south of the present study area are worthy of mention. Both are near or in tributaries of Palo Duro Canyon, about 25 km east of Canyon, Texas. The first, the Little Sunday site, was excavated by Hughes (1955). In a 60 cm thick zone, artifacts, chips, fire-darkened hearth rocks and heat-cracked rocks, presumably from stone boiling, were recovered. Included among the artifacts were 30 end scrapers, 19 side scrapers, eight flake scrapers, seven concave scrapers, five disk scrapers, five graters, and two Clear Fork gouges. Projectile points of six types were recovered: nine Ellis, seven Refugio, two Palmillas, one Lange and one Folsom. Except for the much older Folsom point, all are either stemmed with parallel-sided or expanding stems, or stemless and notchless. Other stone artifacts included triangular knives, blades, drills, choppers, seven subrectangular manos and five milling stones. Fragments of a conch shell pendant were also found. Hughes suggests a date of 2000 B.C. to A.D. 1000 for the site.

The second Archaic site in the Palo Duro Canyon area is Chalk Hollow, excavated by Wedel (1975a). Here there were two midden zones separated by a sterile zone. The older, dated by radiocarbon at ca. 1650 to 400 B.C., was characterized as having large, heavy, corner-notched points identified, with some uncertainty, as Marcos, Castroville, Williams, and Palmillas types, following descriptions presented by Suhm, Krieger, and Jelks (1954). Also found in this layer were bifacial cutting or chopping tools, bone awls, bone gaming pieces, abundant milling stone and mano fragments, stone slab hearths, but no pottery. Bison bone was especially common in about the middle of this lower level.

The upper level, dated by radiocarbon at ca. A.D. 400 to 850, yielded small stemmed or corner-notched points generally in the Scallorn category, plano-convex end scrapers, bifacial chipped knives, milling slabs and manos, bone gaming pieces and oc-

casional pot sherds of a plain brown ware, probably not of local manufacture. Chipped stone included Alibates dolomite, Tecovas flint, Edwards Plateau chert and obsidian. Bones of a wide variety of large and small mammals were recovered.

Since there are a few bison kill sites in the Texas Panhandle that date from the very end of the Archaic period, it is not surprising that similar sites occur in northwestern Oklahoma. Baugh (1982: 36) identifies these as the Twilla, Bell, Strong and Colloer sites (D. Hughes 1977; Tunnell and Hughes 1955), "characterized by buried beds of bison bones that contained chipped stone butchering tools, flake debris, and occasional spearpoints. The latter are typically large ovate to triangular forms with corner notches". These date from about 1800 years ago (Baugh 1982: 36).

Out of nearly 100 sites reported by Adrienne Anderson (1975: 132) from the upper Dry Cimarron drainage in northern Colfax County, New Mexico, only one site was considered by her to be Archaic. Here "two Marcos-like projectiles and a basalt point" were recovered. These she states are similar to one discovered near Folsom, New Mexico by Honea (1964).

Salvage in the Ute Creek Dam and Reservoir area on the Canadian River in eastern New Mexico (Hammack 1965) located one stratified site (LA 5573) which yielded small corner-notched points in the upper level. The middle and lower levels yielded large stemmed and corner-notched points that "resemble the Texas point typology, especially the Ellis, Edgewood, and Williams point types" (Hammack 1965: 46). A date between 3000 B.C. and A.D. 1000 is suggested. Similar large points were not found in surface collections from other sites in the reservoir.

In the extreme northeast corner of New Mexico and northwestern Oklahoma, Renaud excavated several rock shelters in volcanic formations known as fumaroles (Renaud 1930, 1947: 115-118). Deposits, up to 2 m thick, yielded material probably of the Archaic period that he assigned to a "Fumarole Culture." Substantial beds of charcoal and ash suggested prolonged occupation. Faunal remains included bones of bison, deer, elk, jackrabbit, cottontail, coyote, wolf, fox, badger, skunk, prairie dog, various rodents and eagle. Artifacts included numerous metates in the upper two levels, with the most recent ones the larger; all had pecked oval troughs. Bone artifacts included tubular beads and whistles. The chipped stone artifacts were almost exclusively of quartzite, fabricated by percussion and unifacially chipped. These included various crude choppers, or cleavers, faceted pounders, discoidal pieces, large scrapers, thick blades and pointed flakes utilizable as borers. Certainly a great deal of additional information is needed before this complex, if such it is, can be dated or understood. Assigning it here to the Late Archaic period is completely arbitrary.

Renaud also excavated three dry caves near Kenton, Oklahoma, in which were preserved a great deal of perishable material (Renaud 1930, 1947: 119-125). This complex he called the Basketmaker culture because of similarities, especially in perishable materials, to Basketmaker manifestations in the Southwest. Of special interest is the presence of maize. Two grass bundles enclosed shell maize, and a prairie dog-skin bag contained ears of maize. Also found were many cobs, some of them small and thin, numerous kernels of maize, and husk. Other vegetal foods recognized included wild seeds, acorns, wild fruit, and berries; squash was represented by seeds and pieces of rind. Three cakes or disks made of acorns mixed with plums or cherries were recovered. These had a small central hole, presumably for hanging, and weighed up to .75 kg. Faunal remains represented bison, deer, elk, antelope, jackrabbit, cottontail, coyote, wildcat, badger, rodents, birds (including eagle and wild turkey) and turtle.

Metates had pecked oval depressions and manos were of the one-hand type. Chipped stone artifacts, mostly of quartzite, included "a good many points of all sizes," knives, many scrapers of various forms, including end scrapers and concave scrapers, plus knives and borers. These items are characterized as "serviceable artifacts, but not belonging to a beautiful type or an advanced technique." A thin, finely made selenite pendant was also found. Bone artifacts included tubular beads and awls "some flat with many parallel marks . . . suggesting use in basket-making." Wooden artifacts consisted of a knife-like object, perhaps also a basket-making tool, a spear thrower, a dart foreshaft, a tube, a fire drill, and parts of triangular snares. Other artifacts included: woven yucca-leaf sandals of two types; fragments of three or four kinds of baskets, including coiled; pieces and knots of cord and string; and bits of rabbit fur attached to a cord, suggesting a woven fur robe. Renaud also excavated caves on the T.O. Ranch, 45 km east of Raton in northeastern New Mexico. These yielded artifact assemblages very similar to those found at the Kenton Caves and were attributed to the same culture. One of the T.O. Ranch caves yielded the flexed skeleton of a woman accompanied by three metates and many tubular bone beads. Some of the corn cobs found there were stuck on opposite ends of a short stick, a trait also found in prehistoric Pueblo and Fremont Culture (Utah) sites.

Lintz (1980: 4) lists the Kenton Cave sites under the heading of both Woodland and Archaic. Since all these sites lack pottery, I am inclined to consider them Late Archaic.

CHAPTER THREE

THE EARLY CERAMIC PERIOD

The Early Ceramic period, commonly called Woodland or Plains Woodland throughout much of the plains region, is represented by numerous small sites widely distributed over the Central High Plains. Since very few of the westernmost sites investigated and reported upon show intensive occupation, a general summary description must consist largely of inferences based on what is known from the eastern, or prairie lands, of the Central Plains.

The Early Ceramic period, which started in the Central High Plains at about the time of Christ, or perhaps slightly earlier, brought several important changes in Indian culture. For the archeologist the most significant innovation was the appearance of tall, cord-roughened pottery vessels with pointed bottoms. Although there are various identifiable plains subtypes, pottery of this period closely resembles contemporary and earlier Woodland pottery found over much of the eastern United States. Of nearly equal value for identifying "Woodland" sites was the appearance of small, delicate, stemmed (corner-notched) projectile points of a size that could have been used on arrows. Other changes included a less nomadic life style and, in at least the eastern Central High Plains, simple semipermanent dwellings, more elaborate burial practices and probably rudimentary horticulture. Subsistence, however, continued to be based heavily on gathering and hunting, utilizing a wide variety of resources. Basically, lifeway in the Early Ceramic period did not differ markedly from that in the preceding Late Archaic, from which culture it apparently evolved under eastern influences.

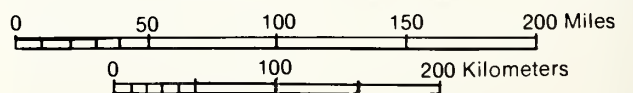
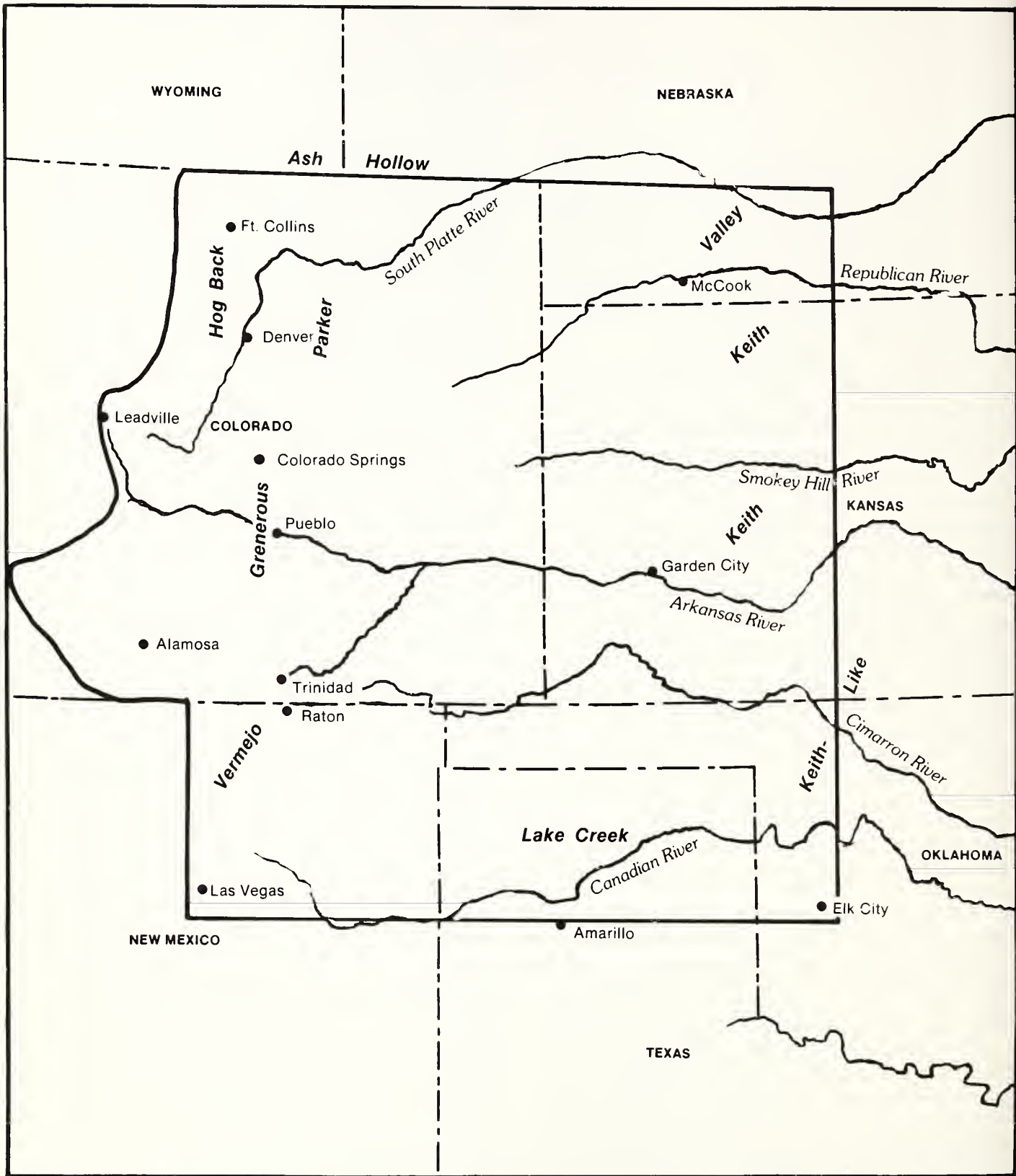
Projectile points from Woodland sites are predominantly stemmed or corner-notched, but within this broad classification they show considerable variation. Most are from 25 to 80 mm long and of poor to fair workmanship; a few show fine workmanship. The margins of the blades are straight to markedly convex and the bases are usually straight to strongly convex. A few are slightly concave, but not notched. Point length varies from equal to the width to three times the width. Rarely is the maximum width of the stem less than $\frac{2}{3}$ the maximum width of the blade. Some of the smaller, finer points are deeply corner-notched so as to leave a pronounced barb along each side of the base as well as an expanding stem. A few of the more delicate points have serrated edges. Some of the cruder points could almost be called side-notched instead of corner-notched, in which

case the expanding stem may be almost as wide as the maximum width of the blade. Many of these, especially the larger ones, are indistinguishable from certain Archaic points. An occasional point or blade is unnotched, and some of the larger notched points could have served as knives rather than as projectile points. Since the smaller points could have been, and probably were, arrow points, we may well have reflected here, in the Early Ceramic period, the first appearance in the plains of the bow and arrow, used along with spears and/or darts. The introduction of this new weapon may account for the heterogeneity, or lack of standardization, of points. Rarely if ever would one mistake a Woodland point for one made during the Middle or Late Ceramic periods by Upper Republican, Great Bend or Dismal River people, for example.

Other chipped stone tools from Plains Woodland complexes are not diagnostic and do not reflect a very great variety of basic types. End scrapers are reasonably common, of indifferent workmanship and of average size by Plains standards. They are roughly round to oval and usually plano-convex, but some have both the dorsal and ventral faces flat. Some flakes were used as scrapers and/or knives. Well-made chipped stone knives vary from small to medium sized and grade into crude small celts or choppers. The distinctive alternately-beveled diamond-shaped knives, so characteristic of the late Upper Republican complex, have yet to be reported from Woodland sites. Objects of ground or pecked stone include irregular sandstone grooved abraders, shallow-basin milling slabs and cobble hammerstones.

Bone artifacts include awls, made from deer metapodials or splinters of bison(?) bones, a possible digging stick point made from a bison leg bone, serrated fleshing tools made of deer or antelope (not bison) leg bones, and needles. Conspicuously missing are bison scapulae hoes and fishhooks common in Upper Republican sites.

Much of the information on Plains Woodland manifestations, especially in Nebraska, reflects the work and continued interest of Marvin F. Kivett. The first general summary (Hill and Kivett 1941) reports the excavation by the Nebraska State Historical Society of a village, 25 VY 1, in Valley County, Nebraska, some 40 km north of the northeast corner of the present study area. This remains the best-reported Woodland site in the state. In addition to report-



SELECTED EARLY CERAMIC COMPLEXES

ing this site, Hill and Kivett describe in lesser detail 39 other Woodland sites distributed over Nebraska. Photographs of restored pottery vessels and sherds from many of these sites makes this publication especially useful. In 1949 Kivett (1949a: 282-283) published a concise and useful summary description of Woodland village sites excavated in the Medicine Creek Reservoir area in southwestern Nebraska. He also reported work at five other Woodland villages in various parts of the state, two of which are in the present study area (Kivett 1952). Immediately following this, he published an excellent report on the important and thoroughly excavated Woodruff "shell-bead" ossuary, located in Phillips County, northwestern Kansas, virtually on the Nebraska state line. The shell-bead ossuary complex is apparently restricted to a small area that centers near Alma, Nebraska (Kivett 1953). More recently, Kivett (1970) has provided a summary of Plains Woodland culture focusing on environmental adaptations, which he had touched on earlier (Kivett 1948).

Kivett was neither the first nor the only archeologist to be concerned with Woodland (Early Ceramic) cultures in the Central High Plains. Among the first to recognize that there had been pottery-making people on the plains prior to those who lived in well-constructed earth lodges was Fred Sterns (1915a, 1915b), who reported a deeply buried occupation level in extreme eastern Nebraska. Strong (1933: 281; 1935: 184-196) summarized information regarding the "Sterns Creek" site and suggested it be assigned to a Woodland culture with northeastern affiliations, perhaps related to Algonkians. Strong also recognized Woodland pottery from the Nebraska Sandhills as distinctive, but at the time considered it a variant of Dismal River pottery (Strong 1935: 270). He discerned differences between the Graham ossuary, which he assigned to the Upper Republican complex, and the nearby Marshall ossuary, now attributed to a Woodland complex; however, he did not recognize the significance of the differences. Wedel (1935a: 188-190) demonstrated considerable insight with regard to Plains Woodland ceramics. He described a large, broken pottery vessel from the floor of House 2 at the Red Cloud 3 site (on the Republican River in southern Nebraska, just east of the area considered here) as "intrusive" and markedly different from the Upper Republican pottery from the site. This conical-bottom vessel, estimated as having been about 30 cm in diameter and 46 cm tall, he noted as resembling vessels from Sterns Creek as well as chance finds from southeastern Nebraska. A few sherds from the Red Willow 1 site he also recognized as different from the usual type; from his description, they, too, were apparently of Woodland authorship. Of possible significance for discussion elsewhere in this work, the two houses at Red Cloud 3 were highly aberrant as compared with those at known Upper Republican sites. Excavation at Ash Hollow Cave (Champe 1946)

clearly demonstrated that Woodland pottery was stratigraphically below Upper Republican, which in turn was below Dismal River pottery.

Woodland occupation in Kansas was well summarized by Wedel in 1959, but at that time he could report only four Kansas sites in the Central High Plains: the Woodruff ossuary on the Kansas-Nebraska line, already mentioned (Kivett 1953), the Young Burial site (14 SC 2) in Scott County, west-central Kansas (Wedel 1959: 468-475), Occupation B at the Pottorff site (14 LA 1) in Lane County, west-central Kansas, and Coal-Oil Canyon in Logan County in northwestern Kansas (Bowman 1959a-c, 1960a-c). Other reports of Woodland sites in Kansas just to the east of the present study area are included in publications by Bass, McWilliams and Jones (1967), Reynolds (1976, 1979) and Witty (1966), with a recent summary by O'Brien (1980). Although there have now been several foci defined within Plains Woodland (Early Ceramic of the Plains), all of the sites in the western half of Kansas are thus far assigned to the Keith focus, a situation which may well reflect paucity of field work rather than cultural homogeneity. Actually, there is general agreement among those active in the area that Woodland sites are numerous in western Kansas; Earl Monger (personal communication) estimates that there are 100 in Pawnee County, west-central Kansas, alone.

Woodland habitation sites in the northeastern Central High Plains are commonly situated on low terraces along small streams—one or two terraces below where one expects to find Upper Republican sites. Other Woodland sites, however, are on ridges. Detritus and black stain from occupation is often relatively thick, up to 1.2 to 1.5 m. The occupation levels are sometimes buried beneath several decimeters of sterile alluvial and/or aeolian deposit. Within the occupation zone, pits of various sizes, presumably for storage, are commonly found, and broad, shallow basins, apparently representing habitations, are sometimes present. Subsistence was based on hunting and gathering. Although there is no direct evidence, the Plains Woodland people in southwest Nebraska may have practiced limited horticulture as did their contemporaries to the east.

There is more published information on Early Ceramic period sites in Colorado than in western Kansas, a fact which may reflect the sampling. In the 1930s, Renaud collected Woodland or Woodland-like pottery from various sites in eastern Colorado, but it is not possible, on the basis of his descriptions, to distinguish these wares from other Plains pottery. More recent work, which will be summarized later, has identified some 50 components that are probably assignable to the Early Ceramic period and which appear to show affiliation with, or influence from, Woodland manifestations farther east. The general picture now emerging is that the resemblances to more eastern (*e.g.*, Mississippi Valley) Woodland complexes are so attenuated that to call sites of

eastern Colorado "Woodland" is to expand that taxon to an absurd limit--unless we are seeing only camps of Woodland peoples from much farther east who were coming into the area temporarily. Thus far, no sites showing long, near-continuous village occupation have been reported between the 102 meridian and the Rocky Mountain foothills. Within this High Plains area, artifacts diagnostic of the Woodland complex are essentially restricted to occasional thick, cord-roughened potsherds and small corner-notched projectile points. However, since the term "Woodland" is so embedded in the literature, I will be using it frequently, along with "Early Ceramic"; hopefully, when more work is done, terminology will sort itself out.

J. Wood has provided a summary description of Early Ceramic period habitation sites in northeastern Colorado, along with reports of his own investigations at several of these (J. Wood 1967: 601-618, *passim*). Sites occur both in the open and in rock shelters. Occupation of these sites appears to have been intermittent, possibly seasonal, rather than long-continuing. However, the fact that a few sites were used repeatedly for burial indicates continuity in at least that type of use. Burial sites, for the most part, have not been assigned to particular phases because pottery, the primary criterion for phase assignment, is not found with most of the interments.

Valley Focus

Although current knowledge leaves it unclear as to whether Valley Focus sites are found in the area we here define as the Central High Plains, it seems likely that they do exist there, since the type site, 25 VY 1, is only about 40 km northeast of our area. This site, excavated and reported by the Nebraska State Historical Society (Hill and Kivett 1941) has essentially become the standard by which all other Woodland sites in Nebraska have been compared. Data from this site were utilized heavily in the general description of Plains Woodland culture presented in this study, as well as in earlier generalizations (*e.g.*, Wedel 1961: 90-92). For our purposes, the most distinctive traits of the Valley focus are those relating to the villages, structures, and pottery.

Eight or possibly 10 structures were excavated at 25 VY 1 (Hill and Kivett 1941). These were all quite simple and for the most part close together. Apparently not all were in use at the same time, for some had been filled with refuse after abandonment. In one instance, the building of a structure had destroyed half of another. The structures consisted of oval basins ranging from 3.4 by 4.3 to 6.1 by 7.3 m in diameter, excavated 30 to 60 cm into the subsoil; basin depth (from the occupation surface) could not be determined, but could have been as much as 1.2 m. Near the center of eight of the 10 basins was a hearth about 60 cm in diameter consisting of hard-

burned earth covered with ash. The hearths were in no way specially prepared. Post holes were found in one structure, but no pattern was discernible. In other structures rodent activity could have obliterated post holes. No clues were found as to the nature of entrances, nor was there evidence, such as charred logs or burned daub, to suggest a substantial superstructure. Hill and Kivett (1941: 188) concluded that the structures were flimsy, probably consisting of skins or mats supported by light poles and props, and that 25 VY 1, a small, compact site, had been long occupied since an occupational level of 0.4 to 1.0 m of debris had accumulated. The site appeared to have been used year-round rather than seasonally.

Several kinds of Woodland pottery from the plains have been formally established as types. One of the most widespread was described in detail by Hill and Kivett (1941: 173-181) and later named "Valley Cord-roughened" by Kivett (1949b), the type site being 25 VY 1. This type, characteristic of the Valley focus, was defined on the basis of 3,384 sherds, of which 256 were rim sherds. Standards for body form were based on five restored vessels and several sizeable large sections.

Keith Focus

The Keith focus has never been described fully or formally. The designation was apparently first applied to two Woodland sites in Frontier County, southwest Nebraska, by Kivett (1949a: 282-284) who later (1952: 63) published the following brief description:

A second variant of the Woodland pattern which is characterized by a cord roughened type of ware has been designated the Keith focus. The pottery type believed characteristic of this focus is the Harlan Cord Roughened which lacks the elaborate rim decorations found on many vessels of the Valley Cord Roughened type. In addition this ware is often fabric impressed or cord roughened on the interior surfaces. There is also sufficient divergence in the remainder of the complex to warrant its assignment to a separate focus. Various shell-bead ossuaries which occur along the Republican River in Nebraska and Kansas are believed attributable to this focus.

The geographical distribution of the Keith focus is given by Wedel (1961: 90) as "central and western Nebraska, western Kansas, and eastern Colorado." There is a growing feeling that the Keith focus has become something of a catch-all because of the paucity of detailed information from much of this area. Once additional work is done in western Kansas and eastern Colorado, it may be necessary to divide and/or redefine the focus.

Kivett (1949a: 282), in summarizing his excavations at two Keith focus Woodland sites in the Medicine

Creek Reservoir in Frontier County, southwestern Nebraska, says:

Habitation areas are in some cases marked by a circular to oval basin, excavated to a depth of 12 to 18 inches [30-45 cm] into the sterile soil below the village accumulation. Near the center of almost every basin is usually a rather poorly defined fireplace on the same general level as the basin floor . . . Post molds and shallow pits often containing refuse occur without regard to a discernible pattern both within the basins and throughout the general village area.

A similar description is provided by Wedel (1953a: 14) specifically for site 25 FT 14, one of the Woodland sites upon which Kivett based his generalization. Radiocarbon dates from these sites are: Site 25 FT 18, A.D. 370 \pm 100, and A.D. 820 \pm 200 (samples SI-126, M-841); Site 25 FT 70, A.D. 690 \pm 80 and A.D. 880 \pm 70 (samples SI-197, SI-50). These dates suggest a Woodland occupation along Medicine Creek spanning some 500 years, although the relatively small amount of detritus is not consistent with an intensive or even continuous occupation for such a long period.

Harlan Cord Roughened pottery, not yet formally defined, is diagnostic of the Keith focus. Sherds are described by Kivett (1953: 131-134) as: characteristically thick; have over-all cord roughening with cord impressions vertical and parallel on the vessel; and are tempered with crushed calcite, with an occasional inclusion of hematite or fine sand. For convenience, I have designated this type of pottery Harlan Cord Roughened. Superficially, it resembles the Valley Cord Roughened type, which characterizes the Valley Focus of the Woodland pattern (Hill and Kivett 1941: 173-181). It appears, however, to be somewhat less well made and to lack the various rim and lip decorations of the Valley Cord Roughened type.

Kivett (1953: 131-134) reports the occurrence of this distinctive Harlan calcite tempered ware from much of Nebraska, including sites in the following counties: Harlan, Webster, Franklin, Frontier, Sherman, Buffalo, Hooker, Richardson, and Platte, as well as from Phillips and presumably Geary Counties in Kansas. Wedel (1959: 553) reports it from Lane, Logan, and Scott Counties in Kansas and states that "Western Kansas, and perhaps parts of eastern Colorado, thus appear to lie within the range of Keith Focus material." At one site (25 SM 2) on Davis Creek in Sherman County, Nebraska, sherds of both Harlan Cord Roughened and Valley Cord Roughened were excavated from a single burial. However, at sites in Harlan, Buffalo, and Sherman Counties, Nebraska, pottery of the two types did not occur at the same site, but did occur at neighboring sites. A restorable vessel of Harlan Cord Roughened was found on the floor of an Upper Republican

house at 25 FR 8 (Red Cloud 3) in Franklin County, Nebraska (Wedel 1935a: 188-189) but the significance of this association cannot be assessed.

Four other pottery types from two Keith focus sites in Hitchcock County, southwest Nebraska, have been described by Kivett (1952). Although these are represented only by small samples at the type sites, they may well be more abundant at other sites. One of these Hitchcock County sites, the Carmody site (25 HK 7) (Kivett 1952: 24-32), is situated on a ridge dividing the Republican River from a tributary, Elm Creek, near its mouth. Bottom land suitable for simple horticulture is nearby. Zone B contained evidence of Woodland occupation, perhaps intermittent. Three areas showed firing: one a circular area outlined with stones, one a rectangular area outlined with sandstone slabs on edge (perhaps a kiln for firing pottery) and an unlined simple hearth or the bottom of a burned pit. Two trash-filled pits were attributed to this occupation as well as three (or more) badly disturbed burials. Prior to salvage archeology much of the site had been destroyed by construction connected with dam building. Artifacts from Zone B included corner-notched projectile points (rare), end scrapers, side scrapers, and a blade fragment, in addition to two categories of pottery.

At the Massacre Canyon site (25 HK 13), also in Hitchcock County, Kivett (1952: 11-12) interpreted as a probable structure a basin 2.6 x 2.1 m. Its depth could not be determined because of erosion, but was at least 0.5 m. He suggested that another basin, 1.2 by 1.5 m, might also have been a structure. Neither basin contained post holes or showed evidence of fire. There may have been other structures at the site that were not detected since the builders might have excavated into village detritus, but not deeply enough to penetrate clean subsoil. However, no hearths were found within village detritus. Four unprepared hearths found at the bottom of accumulated village detritus could simply represent fires made on the original ground surface, or could have been hearths in structures dug through village detritus, but only to the pre-occupation surface. Near one hearth were two post holes, possibly the remains of some sort of structure. One radiocarbon determination on shell from this site indicated a date of 122 B.C. \pm 250 (2072 B.P.) (sample M-181) which is probably too early; since it was on shell it should be rejected in any case. The site can probably be assigned to the Keith focus.

Seven burials were excavated within the Woodland village at the Massacre Canyon site. All were found in a fairly restricted area; each was in an individual pit. Five were flexed and of these only three had grave goods. There were chipped stone tools, a paint stone and a shell bead with one; a necklace of 75 shell-disk beads with the second; and tubular-bone and large shell-disk beads with the third. The skeleton of a child had probably been

Table 4. Faunal Remains at Doyle Site.
(Grange 1980: 125)

Species	Minimum Number of Individuals
Bison	1
Deer	1
Antelope	1
Jackrabbit	5
Cottontail	6
Badger	1
Beaver	2
Raccoon	1
Prairie Dog	3
Pocket Gopher (G)	3
Pocket Gopher (T)	2
Prairie Vole	1
Coyote	2
Frog	1
Painted Turtle	1
Canada Goose	1
Eagle	1
Rough-legged Hawk	2
Marsh Hawk	1
Greater Prairie Chicken	1
Common Raven	1
Great Horned Owl	1
Turkey	1
Teal	1
Mallard	1

scattered by rodents. The seventh burial was secondary, partially cremated, and without grave goods.

The Doyle site (25 RW 28) in Red Willow County, southwestern Nebraska, contained one Keith focus Woodland structure that had probably been rebuilt several times (Grange 1980: 108-110). Only half of this structure was excavated by Grange, but it had apparently consisted of an irregular circular basin about 3.8 m in diameter surrounded by a low rim some 5.5 m in diameter. The rim probably represented the fill excavated from the basin, which was about 0.3 m deep. The floor of the basin was covered by 1.4 to 1.5 m of refuse. In the center of the floor was a fireplace. In the fill above the floor were several other hearths which had probably been on floors of later basins dug into accumulated refuse. Grange suggests that there had been five or six house floors distributed vertically in 1 m of fill, but because of mixing and lack of contrast, the floors could not be detected except by the presence of hearths and one concentration of rocks.

Artifacts from the Woodland component at the Doyle site included several types of pottery: Harlan Cord Roughened, Massacre Canyon Variety A (resembles Harlan Cord Roughened but with sand rather than calcite tempering), and unidentified sherds resembling Valley or Feye Cord Roughened but probably a variation on Massacre Canyon Variety A. Only three projectile points were found: triangular unnotched, corner-notched and a triangular side-notched, perhaps intrusive. Other chipped stone artifacts include a bifacial drill, plano-convex drills, knives of various shapes, end and side scrapers of various forms, graver-perforators, a chopper, and worked flakes. Manos, hammerstones and abraders comprised the ground stone artifacts. Bone artifacts include flakers, awls, a scapula digging tool, socketed tool handles(?), bone beads, a worked human fibula, a shell-disk bead, a shell gorget, shell pendants and 22 shells which had been used as scrapers (Grange 1980: 113-124).

Table 4 lists the species represented among the faunal remains (Grange 1980: 125).

Four Woodland habitation sites are reported from south-central Nebraska by Philips (1963) who carried out limited testing at each. These are located in Dawson, Frontier, and Gosper Counties, and help confirm Woodland occupation in the area.

One probable Woodland structure was excavated at site 14 NT 11 in Norton County, northwest Kansas (Blasingham 1963: 28). It consisted of a pit 3.6 m long, 1.6 m wide and 38 cm deep. In the center were two possible post holes but no evidence of fire. Another pit, filled with trash, was 2.1 by 2.4 m and 0.6 m deep but Blasingham did not suggest that this might be a structure.

One of the most thoroughly reported Woodland sites in the Central High Plains, the Woodruff ossuary in northwestern Kansas (Kivett 1953), makes the mortuary practices the best known traits of the

Keith focus. Strong (1935) had previously reported both Upper Republican and Woodland ossuaries a few kilometers away in Nebraska, but because of the paucity of diagnostic artifacts with the latter, he had not been able to identify either as Woodland. The Woodruff ossuary (14 PH 4), located in Phillips County, Kansas, only meters south of the Nebraska border, is situated on the edge of a terrace overlooking Prairie Dog Creek, just above the limits of the Harlan County Reservoir. Draws, cut into the terrace on either side of the ossuary, leave it on a point. Some 9 m below the site is a narrow flood plain of the creek. The ossuary consisted of a cluster of at least 14 pits up to 2 m deep, with some intersecting others. Subsequently, a more or less oval basin some 6 m across was dug, removing the tops of nearly all of the smaller pits. The fill of both the pits and the larger basin contained disarticulated human bones. The one articulated skeleton was that of an adolescent buried in a flexed position and draped with numerous strands of beads. It had been placed at the south edge of the basin on its floor, which was 0.9 m below the surface of the ground. Although there had been fires in various parts of the ossuary, and some of the artifacts and human bones showed evidence of having been exposed to fire, the articulated skeleton and its accompanying artifacts showed no such evidence.

Portions of at least 60 disarticulated skeletons were recovered. In a few cases a part of a skeleton had still been articulated when buried. Bones, for the most part, had been thrown in at random, probably after having been either exhumed from a previous burial or collected after disintegration of an exposed corpse. There was no evidence of bundle burials. Skulls were rare and generally poorly preserved. There was no suggestion of cremations *in situ*.

Except for thousands of shell beads, artifacts were not abundant. Pottery, a total of ten sherds, came from various parts of the excavation and probably represents several vessels but only one type. The outer surface of the pottery was cord roughened, with the impressions ranging from fine to coarse. Thickness is from 9 to 13 mm and the calcite tempering was in pieces ranging from fine up to 7 mm across. This ware has been named "Harlan Cord Roughened" by Kivett (1953: 132) and assigned to the Keith focus. Thus far, Harlan Cord Roughened is the only pottery found at any of the several ossuaries which contain large numbers of shell beads. This fact suggests that the practice of including numerous shell beads may be restricted to the Keith focus, although the burial traits of other Plains Woodland groups are very poorly known.

The thousands of disk beads from the Woodruff ossuary occurred on the surface and scattered through the fill either at random or in alignments showing that they were strung at time of deposit. The torso of the articulated skeleton had been wrap-

ped with numerous strands. The beads, of freshwater mussel shell, represented every stage of the manufacturing process, which had involved breaking the shells into roughly round pieces, drilling a central hole, usually from the inside only, and grinding the outer surface smooth and flat. The blanks were then strung and the string of beads ground and polished as a unit. Strings of up to 30 beads, all of uniform size, were found still in alignment. Diameters ranged from 6 to 18 mm with the majority 9 mm or less. It is interesting that unfinished beads, even undrilled blanks, were included with Woodland burials, while only finished (and far fewer) beads were included with Upper Republican burials.

A much less common form of shell ornament (9 complete plus 14 fragments) is a crescent-shaped pendant 6.2 to 12.5 cm long and 1.2 to 1.5 cm wide, cut from the ventral margin of a freshwater bivalve, the size reflecting the size of the shell. A hole was drilled in each end. Other pendants, also made from freshwater bivalve shells, are either rectangular with rounded corners or triangular, 4 to 10 cm in maximum dimension, with two perforations. One triangular pendant was cut from a much heavier shell, perhaps a Gulf Coast conch. The stem of such a conch shell, 5.5 cm long, had been drilled from either end to form a tubular bead. Shorter beads, up to 30 mm long and 24 mm in diameter, were probably also made from conch stems.

Olivella shells (21) with the spire cut off and drilled lengthwise were also recovered. Such shell beads occur in a variety of other complexes in the Plains, including Upper Republican and Dismal River. A rather unusual form of shell bead is represented by 8 specimens from the Woodruff ossuary. These are essentially cylindrical with one flat side, about 11 mm long and 6 mm in maximum diameter. A hole drilled into the flat side intersects, at a right angle, one drilled from an end. Strong (1935: 120) reports a single example from the Marshall ossuary.

Other ornaments found at the Woodruff ossuary are tubular bone beads, probably fashioned from bird bones. Most of these (28) are from 9 to 14 mm long and 3 to 6 mm in diameter; one is 30 mm long and 11 mm in diameter. Most have rounded ends and polished sides; none are decorated. A bone tube, 19 cm long, was made from a deer metapodial by removing the distal end, drilling a hole through the proximal articular surface and removing the cancellous portion. Three possible shaft wrenches were made by drilling a hole through the proximal end of deer metapodials from which the distal ends had been removed. One broken bone awl and several cylinders of antler were also recovered from the site. A large number of unmodified rabbit teeth were found in one area.

Chipped stone artifacts from the Woodruff ossuary were made from the locally available red to yellow jasper. Two complete large crude projectile points and three small delicately chipped ones were

recovered. All have expanding stems and are shouldered and barbed. The small points are nearly triangular and have straight to slightly convex edges with concave to convex bases; the large points have markedly convex sides and bases. The edges of one broken point are finely serrated. Six end scrapers, six small crude celts, 35 flakes with retouched edges, two chipped knives and several knife fragments were recovered.

Elsewhere in Phillips County, Kansas, a burial was found washed out of what had once been a small Keith focus Woodland occupation site in the Kirwin Reservoir (Witty 1966). The site had been on a very low terrace along the North Fork of the Solomon River, so low in fact that layers of silt were directly on top of the occupation level. Also recovered from the site were sherds of Harlan Cord Roughened pottery, characteristic of the Keith focus. Chipped stone artifacts included: small, delicate, corner-notched triangular points with an expanding stem and convex or concave bases (one had serrated edges); small, unnotched triangular points with convex bases; blades or knives of various shapes, choppers, and used flakes. Ground stone artifacts included grooved abraders, milling slabs and mullers or grinding stones. A tubular bone bead and a section of an awl were also recovered. The limited human skeletal material, consisting of skull and bone fragments from at least two individuals, is described and discussed by Bass and Grubbs (1966). Another fragmentary burial, associated with a Keith focus occupation in a rock shelter in Lincoln County, Kansas, is also known (Witty 1962; Bass 1962).

A Woodland burial has been reported from Trego County, west-central Kansas, by Finnegan and Witty (1977). At the site (14 TO 301), a burial was found eroding out of a pit where it had been interred in a flexed sitting position. Associated was a limestone boatstone or atlatl weight. Similar artifacts have been found associated with Woodland burials elsewhere (Neuman 1967). The skeletal material is very similar to that of both Plains Woodland and Plains Archaic.

The Woodland occupation at the Pottorff site (14 LA 1) (Wedel 1959: 381-416), in the extreme north-west corner of Lane County in west-central Kansas, was separated by several centimeters of sterile fill from the overlying Upper Republican stratum. Although the latter contained the remains of two houses, the only structural feature attributable to the Woodland occupation was a small basin containing much charcoal and burned earth. Pottery from the Woodland component included mainly Harlan Cord Roughened sherds, with a few sherds very similar except that they were tempered with sand rather than calcite. One sherd closely resembles Hopewell pottery from the Kansas City area (Wedel 1943: 29-41) in that there was an area decorated by rocker stamping set off from the undecorated area by an incised line. Bone and shell artifacts

were rare and nondiagnostic. Chipped stone artifacts included projectile points with corner notches and well defined shoulders, an unnotched point and a point (probably intrusive) with a straight stem and backward-curving barbs. Two heavy stemmed points were found on the surface. Both end and side scrapers were recovered, but they, too, were uncommon.

In Scott County, west-central Kansas, Wedel (1959: 468-475) excavated five burials which he feels are probably Woodland, although no truly diagnostic artifacts were associated with them and no Woodland occupation site could be found in the vicinity. The burials were on a prominent ridge, known locally as Buzzard Knob, and the bones were for the most part poorly preserved. One flexed skeleton, accompanied by a piece of tortoise shell and two incomplete freshwater mussel shells, had been partially covered with boulders. A burial of an infant contained a fragmentary mussel shell pendant, 30 or more tubular bone beads, and toe bones of a dog or wolf. The third burial was that of an adult, loosely flexed; at the right elbow was the worked carapace of a terrapin. Underneath the skeleton, as though they had been contained in a bag, were a bone awl, 50 or 60 undecorated tubular bone beads, a large stemmed projectile point, several scraper-like flints and four spalls; at the left knee or elbow was another section of a terrapin carapace and a perforated mussel shell; a bone bead was at the left wrist. A second infant burial contained two broken freshwater mussel shells. The deepest burial was that of an adult female, flexed on clean white sand, and accompanied by three chipped stone artifacts: a drill, knife and scraper.

Other reported occurrences of Woodland occupation in Kansas include Coal-Oil Canyon (14 LO 1), a stratified rock shelter in Logan County, north-western Kansas (Bowman 1959 a-c, 1960 a-c). In Morton and Stevens Counties, extreme southwest Kansas, one or two Woodland sherds were found at each of four sites during an archeological survey (Brown 1976). I have been taken to an extensive Woodland site about 3 km west of Larned, in Pawnee County, west-central Kansas, by Earl Monger.

Ash Hollow Focus

Champe (1946), in his report of excavations at Ash Hollow Cave (25 GD 2), a stratified site in Garden County in the southeast corner of the Nebraska Panhandle, indicated that Woodland pottery was lower in the fill than Upper Republican pottery. On rather tenuous interpretations of dendrochronological data, Champe (1946: 52) estimated the age of the Woodland occupation as A.D. 1000 to 1150, dates now considered too recent by perhaps several centuries. Although there was mixing between the various strata, stemmed, corner-notched points were shown to be associated with the Woodland pottery, and were replaced by small, side-notched tri-

angular points in the later strata.

Kivett (1952: 63), in his review of various Woodland complexes in Nebraska, had the following to say about the Woodland pottery from Ash Hollow Cave:

Certain thick cord roughened sherds from Lens D in Ash Hollow Cave have been described as similar to the ware of the Valley Focus. A reexamination of this material in the light of new data suggests that this pottery cannot be assigned to either the Valley Cord Roughened or Harlan Cord Roughened types but probably represents an unnamed variety which occurs rather commonly throughout the western Nebraska area, particularly in the Sandhills. In many respects this ware from Ash Hollow Cave compares more closely with the Harlan Cord Roughened type than with the Valley Cord Roughened type. The remainder of the complex, however, suggests that a different focus may be represented.

A detailed description of Ash Hollow Cord Roughened, is provided by Kivett (1952: 36-37).

The Kelso site (25 HO 23), located in Hooker County, west-central Nebraska (Kivett 1952: 33-40), is about 100 km north of what we have defined as the Central High Plains, and well toward its eastern limits. The occupation level, 18 to 64 cm thick, was overlain by 30 to 45 cm of sterile sand. Two concentrations of charcoal and burned earth were apparently the remains of hearths. Except for pottery, which was relatively abundant, artifacts were few and nondiagnostic. The pottery, however, including six restorable vessel sections and 13 rims from at least eight different vessels, provided the basis for Kivett's much more detailed type description of Ash Hollow Cord Roughened.

The Ash Hollow focus of the Plains Woodland pattern was formally proposed by Irwin and Irwin (1957: 30) following an earlier suggestion by Kivett (1952: 66) that Woodland manifestations such as Ash Hollow Cave and the Kelso site were similar to one another but differed from previously established foci. The Irwins would also include components from sites at Agate Bluff, straight north of Denver, nearly to the Colorado-Wyoming border. J. Wood (1967: 610) endorses an Ash Hollow focus, to which he would also assign Component B at the Hatch site, in northeastern Colorado. Thus components he assigned to the Ash Hollow phase (focus) are listed in Table 6.

Other artifacts from the Woodland components at Agate Bluff (Irwin and Irwin 1957: 23) include numerous projectile points, predominantly of expanding stem varieties with straight bases and shoulders, some having barbs. Also present were triangular points with straight or concave bases, for the most part unnotched. Side-notched points, usually associated with Late Ceramic complexes, might have been intrusive into the Woodland deposits but they

Table 5. Components Assigned to Ash Hollow Phase (Focus),
(Wood 1967).

Ash Hollow Cave, Lens D	(Champe 1946)	
Kelso site	(Kivett 1952: 33-40)	A.D. 800 ± 200
Agate Bluff, Site IV	(Irwin & Irwin 1957)	
Hatch site, Component B	(Wood 1967: 384-417)	

have been reported before (rarely) from Woodland sites (Kivett 1952: 18). There is the possibility that delicate triangular points with side notches and sometimes with a basal notch make their first appearance in Early Ceramic times, but I am inclined to consider them intrusive until they are clearly demonstrated to be in association with Woodland complexes. Other chipped stone artifacts from the Woodland components at Agate Bluff include side scrapers, end scrapers, ovoid knives, triangular knives and utilized flakes. Ground stone artifacts include milling slabs and grooved abraders. Bone artifacts include tubular beads made from small mammal bones, a bone disk bead, and splinter awls. Fragments of six arrow shafts ranging from 2 to 10 mm in diameter were recovered. Three had spiral impressions around them, presumably from sinew wrapping; the others had irregular longitudinal grooves. All had had the bark peeled off. A fragment of yucca fiber rope was also recovered.

Sherds of Agate Cord-marked, similar to and perhaps includable in Ash Hollow Cord Roughened, were found evenly divided (10 and 9 each) between the two levels at site IV. In the upper level were 11 sherds of what the Irwins called Owl Creek Fine Cord-marked, which is probably a Middle Ceramic period type. The fact that projectile points significantly outnumbered potsherds strongly suggests that Agate Bluff had been a hunting camp.

The Hatch site (5 WL 38) in Weld County, in the northern tier of northeastern Colorado counties, is also a stratified site, with two rock rings from a Historic occupation overlying an occupation represented primarily by cord-roughened sherds (J. Wood 1967: 284-417). In his general summary, J. Wood (1967: 610) concludes that the closest ceramic relationships of Hatch site pottery are with the Ash Hollow phase.

A sizeable ossuary, almost certainly Woodland, was found in 1932 at Scottsbluff in the extreme western part of the Nebraska panhandle. In the course of digging a potato cellar on the Henry Bisterfeldt property, workmen encountered human bones, some of which were salvaged by interested amateurs. In 1941 information from this excavation was recorded by personnel of the Scottsbluff National Monument and a resulting manuscript (Mattes 1965) was eventually published, along with comments by Breternitz and Wood (1965). The site, situated on a low ridge, contained the skeletons of 32 adults and five infants in four pits. Two of the adult burials were flexed, and one infant burial was probably also primary; the latter, in a pit by itself, had been wrapped with over 700 tubular bone beads from 12 to 25 mm long. One of the flexed adult skeletons, with an associated shell pendant, was in a pit with the skeletons of 19 other individuals, presumably secondary burials. The other flexed burials, accompanied by three shell ornaments, were in a pit with fragments of two charred skeletons and the disarticulated parts

of four other adults. Another pit contained the other nine skeletons, presumably also disarticulated. Apparently a number of artifacts had been found in the various pits, but most of them were taken away by visitors. Artifacts recorded from the site include: three projectile points of Woodland types, an end scraper, two possible atlatl weights ("boatstones"), a flake knife, a bone awl and three shell ornaments.

Northeastern Colorado

Woodland occupation strategies for northern Colorado were discussed by Scott (1973) who considered only those sites that contained pottery identifiable as Colorado "Plains Woodland." Sites that were non-ceramic but otherwise typologically Woodland were excluded because of the strong possibility that they might represent late Archaic occupation. Scott (1973: 2) followed the definition of Woodland presented by Withers (1954) and J. Wood (1967: 603-604):

In essence, the material culture of the Colorado Plains Woodland is described as follows: large to small triangular diagonal notched projectile points with serrated and unserrated blades, a few small lateral notched points, ovate blades, ovate scrapers, various forms of flakes with marginal retouch, hammerstones, bifacial and unifacial handstones and milling stones, expanded base flake drills, splinter awls made from deer metapodials, bone and shell beads, and shell pendants. The pottery is sand and grit tempered, 5-6 millimeters thick, about 4 on the Moh hardness scale; exteriors are cord impressed in parallel, vertical to diagonal rows with occasional overlapping of cord impressions. Rims are direct and unthickened.

In the northeastern quarter of Colorado, Scott (1973) identified 42 sites that conform to his criteria. He drew his data on three of these from published reports, on four from an unpublished M.A. thesis, and on the other 35 from collections and files at the University of Colorado, Denver University and Colorado State University. Some of these latter sites have since been reported in print. All of the Woodland sites included are in the drainage of the South Platte River and those on the plains are in the western two-thirds of the Colorado High Plains. This distribution probably reflects the paucity of survey activity in extreme eastern Colorado, for there are Woodland sites in south western Nebraska within a few kilometers of the Colorado line. In fact, Kivett (1947: 2-3) reported a Woodland site (5 YM 1) near Wray, Colorado, on the Republican River just a few kilometers from the Nebraska border. This he considered one of the most important sites in the area.

Scott (1973) notes that most of the 23 sites in the Plains and Foothills are located on south-facing slopes, or on or near the tops of hills or other eminences, situations probably selected for protec-

tion from the weather or a commanding view of surrounding hunting territories. The site 8 km west of Wray reported by Kivett (1947) is on a low terrace near the Republican River, in a position common for Woodland sites farther east where incipient horticulture may have been practiced. Elevations of Scott's Plains and Foothills sites range from 1200 to 1900 m.

The next most common location for Woodland sites in the area surveyed by Scott is in rock shelters, 13 in number, and ranging in elevation from 1200 to 2100 m. Most of these open to the south or southwest, presumably to take advantage of winter sun. Four Woodland manifestations are classified as Mountain sites, tend to be near travel routes or passes, and are at elevations from 2400 to 3500 m. The two Woodland burials described fit the open-site pattern. All of the sites are near water sources, but not on the main river (South Platte), and appear to be better situated for hunting or gathering than for horticulture.

Parker Focus

The Parker focus, a taxonomic unit that apparently still has validity, was defined by Withers (1954: 1):

The earliest [horticultural and pottery-making peoples had a culture that] belonged to the Woodland Pattern. We have defined two foci of this Pattern, both belonging to the Late Woodland period of the Middle West. A small scattering of sherds has been found which may indicate an earlier Woodland occupation in eastern Colorado, but no definition of these materials seems possible at this time.

One of these Woodland foci has been designated the Parker Focus. This focus is distinguished by cordmarked pottery vessels which have conoidal bases and straight or incurving rims. The associated projectile points are medium to large and usually corner-notched. The greatest concentration of Parker Focus materials is in the Denver Basin and along the South Platte River and its tributaries, but they extend south and west as far as the Rio Grande drainage in Alamosa County.

J. Wood (1967: 603-611) suggests that the components listed in Table 6, all in the Denver Basin, are assignable to, or closely related to, the Parker phase. Dates in Table 6 are from Breternitz (1969) and Wood (1967).

J. Wood (1967: 603) points out that Withers (1954), in his definition of the Parker focus, designated a larger geographical area for this focus than is represented by sites in the Denver Basin and northeast Colorado. It is unclear whether this reflects a lack of work in the remainder of Withers' area or whether the geographical limits need to be redefined.

J. Wood (1967: 604-611) provides us with a de-

scription of Parker phase (focus) pottery, represented by four known varieties. Although he does not name the type, the varieties are designated by letters.

Wood (1967: 603-604) summarizes the nonceramic artifacts of the Parker phase as follows:

large to small triangular diagonal-notched projectile points with serrated and unserrated blades; a few triangular lateral-notched points; ovate blades; end scrapers; various forms of flakes with marginal retouch; hammerstones; unifacial and bifacial handstones and milling stones; expanded base flake drills; splinter awls made from deer metapodials; and bone beads. . . Most of these traits are shared in common with other Early Ceramic Period components in the Western and Central Plains. Pottery, however, exhibits some regional variations.

Evidence of corn from Woodland components is reported by Irwin and Irwin: a cob from a popcorn-like, sixteen-rowed maize from LoDaisKa, and dent corn from sites in the Morrison, Colorado, area (Galinat 1959: 103; Irwin and Irwin 1959: 112). They do not assign these sites to a particular focus or phase but Wood (1967: 605) indicates that they are Parker phase. Although there is the possibility of mixing between levels in a stratified site such as LoDaisKa, similar popcorn-like maize has also been found in a very definite Woodland context at the Lawson site (25 PT 12), in Platte County, east-central Nebraska, and the kernels, although charred, were independently identified as maize by George F. Will and Paul C. Mangelsdorf (Kivett 1952: 57-58).

Four of the sites with components assigned to the Parker focus (table 6) are of special interest. The Uhl site (5 WL 32) is an extensive stratified site in the Battle Canyon area in Weld County, northeastern Colorado (Wood 1967: 57-189). Zone D, the next to the bottom zone, is marked by the appearance of cord-roughened pottery in an artifact assemblage that otherwise is essentially the same as that found in the lowest level. Wood interprets this as evidence of cultural continuity. Charcoal from this zone gave a radiocarbon date of A.D. 195 ± 95 (sample GXO-319).

The Woodland component, Complex B, at the LoDaisKa site just southwest of Denver, Colorado, was seen by Irwin and Irwin (1959: 132-134) as being most closely related to the Ash Hollow focus but with some traits more closely resembling those of the Keith focus. Irwin-Williams and Irwin (1966: 210-211) point out similarities and differences between the Woodland manifestations at Magic Mountain and LoDaisKa, and seem to be suggesting Parker focus affiliation for both. Wood (1967: 603-611) assigns both to the Parker focus. At LoDaisKa, and several single-component sites of the same complex excavated, but not reported, Irwin and Irwin (1959: 132) report artifacts characteristic of the Parker focus. Four radiocarbon dates for the Wood-

Table 6. Radiocarbon dates for Parker Phase,
(from Breternitz (1969) and J. Wood (1967))

LoDaisKa, Zone B	(Irwin & Irwin 1959)	A.D. 690 ± 150, 800 ± 150, 800 ± 150, 980 ± 150
Willowbrook, Level 4	(Leach 1966)	A.D. 660 ± 100
Magic Mountain, Zone A	(Irwin-Williams & Irwin 1966)	
Hall-Woodland Cave	(Nelson 1967b)	
Uhl site, Zone D	(Wood 1967: 54-189)	A.D. 195 ± 95
Hackberry Canyon site	(Wood 1967: 189-213)	
McEndaffer Rock shelter, Complex A	(Wood 1967: 283-340)	
Biggs site, Stratum VI (Loc. II)	(Wood 1967: 340-383)	A.D. 550 ± 90
Biggs site, Stratum IIc (Loc. I)	(Wood 1967: 340-383)	
Kasper site, Complex A	(Wood 1967: 478-500)	
Michaud site	(Wood 1967: 611)	
A.D. 150 ± 110		
5 WL 43 ?	(Wood 1967: 417)	
5 WL 44 ?	(Wood 1967: 456-461)	
5 LO 7 ?	(Wood 1967: 474-477)	
5 LO 9 ?	(Wood 1967: 509)	
5 MR 1 ?	(Wood 1967: 509-510)	

Table 7.

Early and Middle Ceramic Period Radiocarbon Dates From

Northeastern and East-Central Colorado

(from Butler 1980)

Bayou Gulch (5DA 265)	800±50 BP (AD 1150) DIC-1503 Charcoal	Late Woodland	Gooding 1980a Feat 20, 40 cm b.s.
Bayou Gulch (5DA265)	870±55 BP (AD 1080) DIC-1507 Charcoal	Late Woodland	Gooding 1980a Feat 12
Spring Gulch (5LR252)	880±180 BP (AD 1070) UGa-1051 Charcoal	Middle Ceramic (Hog Back Phase)	Kainer 1976: 31, 215ff Level II, Locality III
Jarre Creek Colo: K: 12: 9 (5DA541)	900±250 BP W-1018 Charcoal	Franktown Focus- Transitional Woodland to Upper Republican	Scott 1963: 48
T-W Diamond (4LR200)	930±230 BP (AD 1020) A-1273 Charcoal	Late Prehistoric	Flayharty & Morris 1974: 168
Spring Gulch (5LR200)	935±140 BP (AD 1015) UGa-1050 Charcoal	Middle Ceramic (Franktown Focus, Hog Back Phase)	Kainer 1976: 31, 215ff Level II, Upper Locality I
Boyou Gulch (5DA265)	950±60 BP (AD 1000) DIC-1440 Charcoal	Late Woodland	Gooding 1980a Feat 3, Fire basin
LoDaisKa (5JF142)	970±150 BP (AD 980) M-1003 Charcoal	LoDaisKa Complex B - "Woodland"	Irwin and Irwin 1961: 114
Murray Site (5BL65)	970±100 BP (AD 980) M-1542 Charcoal	Late Prehistoric (Hog Back Phase)	Benedict 1975: 16 High Altitude Game Drive

Table 7. (continued)

Van Bibber Creek (5JF10)	1050±250 BP (AD 900) W-616 Charcoal	Woodland (Parker Focus(?))	Rubin & Alexander 1960: 156; Nelson 1969: 105 Zone A
Bayou Gulch (5DA265)	1050±55 BP (AD 900) W-1438 Charcoal	Late Woodland	Gooding 1980a Feat 1
Spring Gulch (5LP252)	1075±135 BP (AD 875) UGa-664 Charcoal	Middle Ceramic (Franktown Focus, Hog Back Phase)	Kainer 1976: 31, 215ff Level II, Upper Locality I
Peavy Rock Shelter (5LO1)	1145±155 BP (AD 805) GX-0318 Charcoal	Upper Republican (Middle Ceramic)	Wood 1967: 226, 282 Fill of Feat 5
Parker-Hunt	1150±150 BP	Woodland	Hunt 1954: 114
LoDaisKa (5JF142)	1150±150 BP (AD 800) M-1008 Charcoal	LoDaisKa Complex B - Woodland	Irwin & Irwin 1961: 114 Intrusive from Complex B levels
LoDaisKa (5JF142)	1150±150 BP (AD 800) M-1005 Charcoal	LoDaisKa Complex B - Woodland	Irwin & Irwin 1961: 114
Uhl Site (5WL32)	1210±150 BP (AD 800) GX-0324 Mammal bone	Middle Ceramic (Upper Republican)	Wood 1967: 182
LoDaisKa (5JF142)	1260±150 BP (AD 690) M-1002 Charcoal	LoDaisKa Complex B - Woodland	Irwin & Irwin 1961: 114
Scratching Deer (5BL69)	1260±95 BP (AD 690) I-3265 Charcoal	Late Prehistoric (Hog Back Phase)	Benedict 1975: 272 High Altitude Camp
Bayou Gulch (5DA265)	1270±95 BP (AD 680) DIC-1439 Charcoal	Woodland	Gooding 1980a A/B Horizon (Strati- graphic level date)
Happy Hollow (5WL101)	1270±80 BP (AD 660) Gak-1303 Charcoal	Upper Republican	Steege 1967 Too early - see W. R. Wood 1971

Table 7. (continued)

Willobrook (5JF6)	1290±100 BP (AD 660) GX-0526 Charcoal	Upper Republican	Leach 1966: 46 Site called "L. B. Shelter" in Irwin & Irwin-Williams 1966
Hazeltine Heights (5AM3)	1305±100 BP (AD 645) 1-885 Human bone	Woodland	Buckles, et al. 1963: 27, 31 Burial 6
Spring Gulch (5LR252)	1315±135 BP* (AD 635) UGa-675 Charcoal	Early Ceramic (Franktown Focus)	Kainer 1976: 31, 215ff Level III, Upper Locality I
Bayou Gulch (5DA265)	1350±65 BP (AD 600) DIC-1505 Charcoal	Woodland	Gooding 1980a Feat 18
Bayou Gulch (5DA265)	1520±50 BP (AD 430) DIC-1504 Charcoal	Woodland	Gooding 1980a Feat 10
T-W Diamond (5LR200)	1550±340 BP (AD 400) A-1272 Charcoal	Late Prehistoric	Flayharty & Morris 1974: 168 Too early
Bayou Gulch (5DA265)	1660±55 BP (AD 290) DIC-1469 Charcoal	Woodland	Gooding 1980a Feat 5, 16S/2W
Lykins Valley (5LR263)	1675±85 BP (AD 275) UGa-818 Charcoal	Late Prehistoric?	Ohr, Kvamme & Morris 1979: 20, 52 Hearth B, 110 cm b.s.
Metate Cave (5LA211)	1680±95 BP (AD 270) GX-0718 Charcoal	Middle Woodland or Early Ceramic (Graneros Focus ?)	Campbell 1969: 188, 345
Spring Gulch (5LR252)	1705±70 BP (AD 245) UGa-673 Charcoal	Early Ceramic (Franktown Focus)	Kainer 1976: 31, 215ff Level III, Middle Locality I
Uhl Site (5WL32)	1755±95 BP (AD 195) GX-0319 Charcoal	Early Ceramic (Woodland)	Wood 1967: 78, 178, 183 Fill of Feat 2

Table 7. (continued)

Krebs-Klein (5WL47)	1780±130 BP -150 (AD 170) I-188 Bone	Plains Woodland	Scott 1979 Secondary Burials
Michaud Site A (5AH2)	1800±110 BP (AD 150) GX-0529 Human Bone	"Woodland"	Wood 1967: 615 Burial 1
Rainbow Creek Colo: K: 12: 7 (5DA124)	1360±200 BP (AD 590) W-290 Charcoal	Woodland (Parker Focus)	Rubin & Suess 1954: 446 Scott 1963: 48
Lykins Valley (5LR263)	1370±175 BP (AD 580) UGa-812 Charcoal	Late Prehistoric (?)	Ohr, Kvamme & Morris 1979: 20, 52 Hearth A, 198 cm b.s.
Biggs Site (5WL27)	1400±90 BP (AD 550) GX-0565 Mammal bone	Early Ceramic (Woodland)	Wood 1967: 349, 381
Bayou Gulch (5DA265)	1440±55 BP (AD 510) DIC-1502 Charcoal	Woodland	Gooding 1980a Stained Area XU136N/50W 52-58 cm b.s.
Spring Gulch (5LP252)	1485±70 BP** (AD 465) UGa-1049 Charcoal	Early Ceramic (Franktown Focus)	Kainer 1976: 31, 215ff Level III, Upper Locality I
Helmer Ranch Colo I: 12: 6 (5DA123)	1490±160 BP (AD 460) W-289 Charcoal	Woodland (Parker Focus?)	Rubin & Suess 1954: 446 Scott 1963: 46
Belwood Site (5PE278)	1500±55 BP (AD 450) GX-0325 Charcoal	Woodland Graneros Focus	See Withers 1954: 1-2; Hunt 1975 Bell-shaped pit of dwelling. This is Graneros Canyon Z: 1: 11 of Withers 1954.
Hutcheson Burial (5LR97)	1805±105 BP (AD 145) GX-0531 Human bone	"Woodland"	Wade 1966: 80 Burial 3

* ± 70 (RC)

** ±130 (RC)

land occupation at the LoDaisKa site are: 980 ± 150 B.P. (A.D. 989), 1150 ± 150 B.P. (A.D. 800), 1150 ± 150 B.P. (A.D. 800), and 1260 ± 150 B.P. (A.D. 690) (samples M-1003, M-1008, M-1005, and M-1002).

At the Magic Mountain site, just west of Denver, the uppermost zone, A, contained evidence of a Woodland occupation much more extensive a really than any of the earlier components and unusually large as compared to other nearby Woodland sites (Irwin-Williams and Irwin 1966: 207-219). Although the excavators see similarities to both the Ash Hollow focus and the Keith focus, they conclude that Zone A should probably be assigned to the Parker focus. In addition to the characteristic cord-roughened pottery, other artifact types support this assignment, and distinguish the Woodland component from earlier ones at Magic Mountain. Burials assignable to the Woodland occupation at Magic Mountain are supine or flexed in shallow graves, or seated in a bell-shaped pit. The former were accompanied with mainly utilitarian grave offerings, occasionally with more exotic items such as shell ornaments or a big-horned sheep skull made into a headdress--the latter with minimal grave goods.

The Woodland component in the Willowbrook Rock shelter (5 JF 6), just south of Denver, lies above the stratum containing the Archaic component; the two deposits are stratigraphically as well as culturally different (Leach 1966). The diagnostic artifacts from the Woodland component are projectile points and ceramics. Since few good descriptions of Woodland pottery from the foothills are available. Five hearths are attributed to the Woodland occupation. All are excavated pits, 36 to 41 cm in maximum diameter and 25 to 36 cm deep; some are rock-filled.

Other Possible Parker Focus Sites

Several other sites in Colorado are reported in the literature for which a Woodland assignment is proposed, sometimes highly tentatively; in most of these cases no phase is suggested. In the area that is generally dominated by the Parker focus, several sites should be mentioned. The Wilbur Thomas shelter (5 WL 45) (Breternitz 1971; Gillio 1971; Luebbers 1971 and Zimmerman 1971) is located just south of the Wyoming border, straight south of Denver. Four levels are postulated, but clear stratigraphy could not be demonstrated. At site 5 JR 10, on Van Bibber Creek in the foothills west of Denver, C. Nelson (1969) reports both Woodland pottery and possible non-Woodland pottery, along with typical stone artifacts from the upper level. Stieghorst and Bennet (1973) suggest a possible Woodland affiliation for site 5 JF 12 in Golden, Colorado. An occupation in Bison Hump shelter (5 DA 198) 56 km southeast of Denver was attributed to Woodland peoples by Hollingsworth (1976). Two hearths at the

Lykins Valley site (5 LR 263) were dated by radiocarbon at A.D. 580 ± 175 and A.D. 275 ± 85 , but no diagnostic artifacts were associated (Ohr, Kyamme and Morris 1979).

Several burial sites which could be Early Ceramic or Archaic, but which lacked diagnostic artifacts have been reported from northeastern Colorado. These include the Grahagan-Lipe site (5 MR 3) located 80 km northeast of Denver (Scott and Birkedal 1972; Wood 1967: 612); the Hutchinson Burial site (5 LR 97) in Larimer County with a radiocarbon date of A.D. 145 ± 105 (Wade 1966, Breternitz and Wood 1965); a burial near Golden (Nickens 1977); and the Hazelton Heights site (5 AM 3), 19 km north of Denver, with a radiocarbon date of A.D. 645 (Buckles et al. 1963; Breternitz 1972).

Other possible Parker focus sites are located in southeast Colorado, well outside the area where such sites are concentrated, but not far out of the range originally defined for the focus by Withers (1954). On the Chaquaque Plateau, about half way between the Rocky Mountains and the Kansas line and not far north of the New Mexico line, Campbell (1976: 51) sees evidence that the earliest Woodland complex evolved out of the local Archaic complex. At six sites, or components, there was evidence of Plains Woodland traits in addition to a high percentage of Archaic materials, *e.g.*, Woodland pottery associated with Archaic points. Campbell (1976: 51) states that "the cultural materials of this stage may approximate those defined by A.M. Withers as the Parker focus (1954: 3)." The dominant point type is the small triangular to leaf-shaped Catan point. Ellis and Yarbrough points continue. Kent points, which resemble crude Yarbrough points, and the small stemmed or side-notched Scallorn points are also found, the latter suggesting the bow and arrow for the first time. Other artifacts include:

"bifacial triangular, ovate, blade, and asymmetrical flakes; a bifacial chopper; a unifacial chopper; unifacial asymmetrical flakes; graters; utilized triangulate, ovate, and asymmetrical flakes; and small rectangular, triangular, and oval-shaped side scrapers . . . tapering flanged drill(s), . . . unifacial metates, one-hand, bifacial, loaf manos . . . [and] a two-handed, unifacial, loaf mano."

A few deeply cord-marked Woodland sherds occurred at two of the six sites. Hunting of both large and small mammals continued.

The earliest radiocarbon date that Campbell (1976: 45) obtained for a site with a Woodland component was A.D. 270 ± 95 from Metate Cave (LA 211), although it is not clear whether this component was one of those tentatively assigned to the Parker focus.

Hog Back Phase

C. Nelson (1971: 11) proposed a new Woodland

phase on the basis of data recovered from excavations at the George W. Lindsay Ranch site and other sites in the foothills near Denver. This, the Hog Back Phase, is characterized by:

(1) seasonally occupied hunting camps are indicated; (2) the cultural affiliation is 'Woodland'; (3) the dates are approximately A.D. 600 to 1000 (see Breternitz 1969); (4) sites occupied include small rock shelters and overhangs and open sites on prominences; and (5) diagnostic artifacts that include small corner-notched projectile points with a high incidence of serration, ovoid knives or projectile point preforms/blanks, cord-marked Woodland pottery, although not particularly abundant, and naturally 'polished stones' which are not indigenous to the area but do occur in cultural deposits.

For some reason the trait that distinguishes the Lindsay Ranch site most conspicuously from other Woodland manifestations, structures outlined with large irregular pieces of rock, is not included in the description. Other components that Nelson sees as representative of the Hog Back phase occur at Lo-DaisKa, Magic Mountain, Hall-Woodland Cave, Willowbrook, Van Bibber Creek and possibly the Rainbow Creek site. These components are generally assigned to the Parker phase and Nelson recognized the possibility that the Hog Back phase might be included within the Parker phase.

Benedict (1975a: 172) accepts the idea of a Hog Back phase but concludes:

I am less certain than Irwin-Williams and Irwin (1966: 210), Nelson (1971: 11), and others, that the Hog Back Phase was a variant of the Plains Woodland Culture, although I do not doubt that it was influenced by contact with neighboring Woodland complexes. The distribution of Hog Back Phase components suggests a strong mountain orientation, and seasonal transhumance westward from the Front Range foothills. From an ecological perspective, it would have been easier for mountain-adapted Shoshonean people to acquire cord-marked ceramics by trade than for Plains Woodland potters to adapt to the unfamiliar environment and resources of the Rocky Mountain crest.

It remains to be seen how viable the concept of the Hog Back phase will be and how it will eventually be defined. This may be the first step in cutting out from the more inclusive "Woodland" taxon many of the Early Ceramic period sites found in eastern Colorado and even western Kansas. As mentioned earlier, to call these sites "Woodland" with the implied close cultural relationship to contemporaneous sites found throughout the eastern half of the United States, probably stretches the concept beyond a reasonable limit.

The George W. Lindsay Ranch site (5 JF 11), 11

km northwest of Denver, is situated on a rocky ridge at an elevation of 1900 m (Nelson 1971). The structures, each 3.8 m square, are 1.2 m apart. The walls, about 30 cm high, are made up of irregular pieces of rock up to 45 kg in size, crudely laid. A use-stained surface, 8 cm below ground level, had apparently been partially prepared by leveling. One room with walls on three sides, had a basin-shaped fire pit; the other room, completely enclosed, had three rock-filled fire pits and a possible storage basin 20 cm deep and 36 cm in diameter. There had probably been a superstructure of perishable materials. The artifacts included 27 Woodland pottery sherds; 44 projectile points, all small, triangular and corner-notched, -- many serrated, and 1.5 to 2 times as long as wide; seven ovoid knives or point preforms, three flake end scrapers, 19 utilized flakes, and one mano or metate fragment.

Two high-altitude sites northwest of Denver, Colorado, were investigated by Benedict (1975a, 1975b) who assigned them to the Early Ceramic period, Hog Back phase. The Murray site (5 BL 65) is a tundra game drive on the east slope, near the summit of Mount Albion in Boulder County at an altitude of 3,600 to 3,720 m. It consists of 13 dry-laid stone walls, 483 cairns, and 16 circular to oval rock-walled pits, used in conjunction with steep cliffs and natural corridors. Nearly all the artifacts and the dated charcoal came from the pits, which were 1.5 to 2.7 m in diameter and up to 1.1 m deep. Three of the pits yielded a total of 22 small corner-notched projectile points, one side-notched point, a multi-notched point, an ovate bifacial knife and a triangular side-and-end scraper plus 197 flakes. Radiocarbon dates from the site are: 970 ± 100 B.P. and 670 ± 150 B.P. (samples M-1532 and SI-301). The more recent date could be related to the occupation represented by the side-notched points. Primarily on the basis of the small, triangular, corner-notched points, many of which were delicately serrated, the site can be assigned to the Hog Back phase.

The second high-altitude site, the Scratching Deer site (5 BL 69) described by Benedict (1975b), is located at the upper fringes of the subalpine forest northwest of Denver, Colorado. The site, a single-component camp site, was probably occupied by hunters. Two unlined, shallow-basin hearths contained an abundance of charcoal. The six projectile points from the site were small, ovate to triangular, corner-notched and both unserrated and serrated. A preform, a biface fragment, chipping debris and fragments of a milling slab were also recovered. The points were somewhat larger than, but closely resembled, those from the Murray site, and on the basis of the points, both sites were assigned to the Hog Back phase. A radiocarbon date of 1260 ± 95 B.P. (sample I-3265) agrees well with other lines of evidence.

Rock alignments of unknown function occur in the Front Range of Colorado. Husted (1963), draw-

ing heavily on Moomaw (1954), describes one site in Rocky Mountain National Park where, at 3,500 m elevation, two lines nearly come together at a right angle. One arm is 73 m long and the other 155 m long. The walls are only about 30 cm high and would not appear to have been suitable for any sort of game drive. Perhaps some of these could be assignable to the Hog Back phase, but many are likely to be Archaic in age.

Graneros Focus

This focus was defined by Withers (1954) as follows:

The other defined unit of Woodland materials has been called the Graneros Focus. The pottery of this focus is cordmarked. The bases of the vessels are conoidal and the rims are straight or slightly outcurved with sometimes a smoothed area around the rim. The projectile points are commonly corner-notched and range from very small to large. Two houses of the Graneros Focus have been excavated. One is a circular structure about eighteen feet [5.4 m] in diameter and had eight support posts set in the floor near the wall. Dry laid masonry extended around the base of the wall for about two thirds of the house. The hearth was centrally located, but the four central support posts characteristic of later plains earth lodges are lacking. The other structure is a small pithouse, roughly oval in shape, with a covered entrance passage to the east. Some of the ceramic and lithic traits of the Graneros Focus may indicate that it is slightly later in time than the Parker Focus, but it, too, must be placed in a Late Woodland horizon. So far Graneros focus materials have been found only along the Arkansas and its tributaries in Southern Colorado.

Unfortunately, there is very little information in the literature on sites attributable to this focus. Breternitz (1969: 118) published a radiocarbon date of A.D. 450 \pm 55 for a Graneros Canyon site (Colo. Z: 1: 11) just southwest of Pueblo, Colorado, that is apparently the type site. Also, Wood (1967: 649) states that this date is for the site from which Withers (1954: 1-2) reports two structures.

Campbell (1976: 52) suggests that most Woodland sites on the Chaquagua Plateau, 125 km south-east of Pueblo, Colorado, are local manifestations of the Graneros focus and divide the complex there into three unnamed temporal horizons. He dates the initial horizon, to which he assigns 20 sites, at A.D. 450 to 750 which fits well with the radiocarbon date for the type site. In the initial horizon arrow points and dart points are equally represented. Arrow points are usually corner-notched, but a few are unnotched and dart points were largely of the Catan type. Other chipped stone tools were primarily of types found in the earlier complexes, but small end

scrapers occur in the later horizon. Uniface slab metates and one-hand loaf manos continue; manos may have either one or two faces. Cord-marked sherds, even though found in only three of the 20 sites, are more common than before. Large mammals were more important than small ones and there is indirect evidence of maize horticulture, perhaps the growing of Chapalote-Reventador. Many simple stone enclosures were constructed and occupied. Most consisted of single circular units 2.4 to 4.6 m in diameter, with low, horizontally placed, dry-laid slab foundations surrounding saucer-shaped floors. A few sites had three rooms and in one case a room was partitioned. Campbell comments on the similarity of these structures to those of the Los Pinos phase (A.D. 1-400) of the upper San Juan River valley, which were followed by Sambrito Phase Basketmaker III pithouses with antechambers (Dittert et al. 1963). Campbell feels that Los Pinos architecture could have inspired the partitioning of Graneros structures. There are perhaps even greater similarities between the Initial Graneros structures and those of the contemporaneous and much closer Vermejo phase of the Cimarron area (Glassow 1980: 71), which is discussed later.

The Middle Graneros horizon, represented at 20 sites on the Chaquagua Plateau, is presumed to date at A.D. 750-1000. There were few major innovations during this period, but the cultural pattern became more varied. Arrow points are much more common than dart points, with Scallorn points dominating; unnotched points gained in frequency. A new race of maize entered the area and evidence of horticulture is certain. Both single-room and contiguous-room stone structures are present. In addition, barrier or defensive walls are found at many sites.

Late Graneros culture, the final stage of the Plains Woodland horizon (A.D. 900-1050) on the Chaquagua Plateau is represented at 13 sites: campsites, rock shelters, and stone enclosures. Enclosures with vertically placed slabs may have appeared at this time, and pottery with shallow cord-marking that resembles Borger Cord-marked began appearing, in addition to Woodland pottery. Other traits continued much as before.

On the basis of rather minimal evidence J. Anderson (1976) assigns three additional sites from southeastern Colorado to a Woodland complex. These three, 5 PE 15, 5 PE 29 and 5 PE 79, are located on the Red Top Ranch about 55 km southeast of Pueblo, Colorado. The first, an open site, consisted of 10 stone enclosures at least some of which contained hearths. One unnotched triangular projectile point was recovered. The second site, a rock shelter, had been occupied twice, and contained a wall that had been built during the early occupation. Diagnostic artifacts recovered included small corner-notched projectile points and cord-marked pottery. There are petroglyphs of snakes and deer(?) on the east wall. The third site, an open site without structures,

yielded a fairly large corner-notched point and small, triangular, corner-notched or unnotched points. Much of Anderson's report is devoted to a detailed analysis of flaking technology.

Woodland Sites in Texas and Oklahoma

About 32 km northeast of Borger, Texas, in the north-central Panhandle, is the Lake Creek site, a Woodland site excavated by Hughes (1962). The occupation layer extended for 30 to 60 cm below the surface. From the limited excavation, two kinds of pottery were recovered, the more common being cord-roughened. For the most part the cord markings were indistinct, but in a few cases they were deep, coarse and widely spaced; on some the cord marks crossed, forming an open-mesh pattern. These predominantly gray sherds were tempered with coarse angular particles of limestone and quartz grains. The curvature of the sherds suggested a large vessel with a slightly constricting neck. Hughes suggests that this ware from Lake Creek belongs to the same general ceramic tradition as Borger Cord-marked, an Antelope Creek focus (Panhandle aspect) type, but that the Lake Creek sherds themselves probably belong to an earlier, unnamed Woodland type. A minority pottery type had a plain brown to black surface, abundant feldspar temper, compact homogeneous paste, and closely resembles Jornada brown ware (Jelinek 1967: 47-49) of the middle Pecos River valley in eastern New Mexico.

The association here of Jornada brown ware, a Pueblo type, with cord-roughened Woodland pottery is an interesting clue to Plains-Pueblo contact that should be investigated further. The occurrence of these types together in surface collections is common in the Panhandle according to Jack Hughes (personal communication). The fact that the chipped stone artifacts from Lake Creek are of local material led Hughes to conclude that the site represents an indigenous population, not a group that was passing through the area. Jornada brown ware, however, apparently has not been found at the later Panhandle aspect sites (Hughes 1962: 82); the Pueblo trade pottery from Panhandle aspect sites was apparently all from farther north from the general Santa Fe area (Krieger 1946: 47). On the basis of the very limited work done at Woodland sites in the Texas Panhandle, it is not yet obvious what influence resulted from contact with Pueblo peoples from southeastern New Mexico.

Most of the projectile points from the Lake Creek Woodland component are small and thin and considered to be arrow points. Included are ovate, triangular, side-notched and corner-notched forms. Two heavy corner-notched points, probably dart points, were recovered, as was a fragment of a corner-notched point of medium weight. A fragment of a diamond-shaped, alternate-bevel knife typical of later Panhandle aspect sites was recovered,

as were parts of plain chipped knives and flake knives. Scrapers were common and included snub-nosed end scrapers, thin-bitted end scrapers, side scrapers and flake scrapers. Three gravers were found. Also common were manos: oval, rectanguloid, beveled and wedge-shaped. Thin grinding slabs from the site resemble ones from nonceramic sites in the area; all are of hard dolomite. Thick grinding slabs of Alibates dolomite resemble those of the Panhandle Aspect. Although the sample is small and some of the specimens were from the surface, Hughes concluded that the Lake Creek focus is probably a late Plains Woodland complex dating from well before A.D. 1300, primarily on the basis of the brown-ware trade sherds and similarities to Woodland manifestations farther north. Hughes (1962: 84) is probably correct when he says, "The general character of the pottery, the light triangular points, and certain other traits indicate that the Lake Creek Focus ultimately may be shown to have a place somewhere in the genealogy of the Panhandle Aspect."

From Texas County, the middle county in the Oklahoma Panhandle, Lintz (1978b: 131) reports a Plains Woodland stage at the Johnson-Cline site, in upland dunes. The Woodland occupation is represented by nine corner-notched Scallorn points and perhaps by 20 large corner-notched projectile points within the Marcos-Marshall series. These latter could just as easily be from a Late Archaic occupation at the site, which also shows evidence of Paleoindian, Early Archaic, and Middle Ceramic period occupations.

Although they are out of the area of the Central High Plains or are only minimally reported, several references to Woodland sites in western Oklahoma should be mentioned. Lintz (1976a: 9) indicates that there are numerous Plains Woodland sites and refers to the "Pruitt site (Barr 1966), Brewer site (Duffield 1953), Freeman and Hudsonpillar sites (Bastian 1969), Duncan-Wilson sites (Lawton 1968), and Von Elrn site in Oklahoma (Hartley 1974)." Lintz (1978b: 114) tabulated the radiocarbon dates for Plains Woodland sites on the southern plains in Oklahoma (table 8).

Vermejo Phase

The foothills and canyons of the Sangre de Cristo Mountains in the vicinity of Cimarron, New Mexico, are archeologically peripheral to the Taos area and less extensively investigated. Nevertheless, sites that have been excavated near Cimarron include some that are apparently earlier than any dug in the Taos area. These sites are comparable to both early and late Basketmaker sites found elsewhere in the Southwest.

Glassow, who has reported some 300 sites on and near the large Philmont Scout Ranch which nearly surrounds Cimarron, New Mexico (1972, 1980), has

Table 8. Radiocarbon dates for Plains Woodland Sites in Oklahoma
(Lintz 1978b: 114)

Site	Dates B.P.	AD/BC	Lab No.	Reference
Pruitt	1260±90	690 A.D.	(GaK-899)	Wyckoff 1968
	1140±90	810 A.D.	(GaK-900)	Wyckoff 1968
Von Elm	1360±60	590 A.D.	(Tx-1908)	Hartley 1974
	1750±80	200 A.D.	(Tx-1907)	Hartley 1974
	1740±60	210 A.D.	(Tx-1909)	Hartley 1974
	1470±50	480 A.D.	(Tx-1910)	Hartley 1974
Vickery	1520±80	430 A.D.	(Tx-1911)	Hartley 1974
Duncan-Wilson	1430±170	520 A.D.	(Sm-772)	Lawton 1968
	918±195	1032 A.D.	(Sm-693)	Lawton 1968
NCE3-RS1	1390±150	560 A.D.		Nowak n.d.

assigned 17 to 21 of these to a Vermejo phase which he dates from A.D. 400-700. He sees sites of the Vermejo phase as comparable to early Basketmaker components in the San Juan drainage.

Vermejo Phase sites are generally on high terraces or bluffs along canyons, and usually consist of one circular structure of horizontally laid masonry about 1 m high and rarely more than 5 m in diameter. In one structure excavated, there was evidence of upright support posts. Midden deposits are thin and contain no pottery. Remains of corn are found, but manos and metates are rare; shallow-depression milling slabs are more common than open-end trough metates. Points, of a small corner-notched type also found in later phases in the Cimarron area, are rare at Vermejo phase sites, as are other artifacts. Two excavated sites assigned to this phase were dated by radiocarbon: one at A.D. 510 and the other at A.D. 1095. Glassow (1980: 72) considers the later date too recent, but points out that the site is somewhat aberrant for the phase.

Pedregoso Phase

The next phase in the Cimarron, New Mexico area is labeled the Pedregoso, and is dated at A.D. 700-900 on the basis of radiocarbon. Glassow (1980: 72) describes one site included in this phase (NP 1E) as follows:

The approximately 100-foot-square [30-meter-square] excavation of this component revealed a variety of structural features, including several varieties of firepits; bottle-shaped roasting and storage pits of varying sizes; dense scatters of fist-sized, fire-reddened hunks of sandstone; linear alignments of sandstone blocks; scattered post holes; two peculiar 18-inch-deep [46 cm] trenches; and a broad, flattened activity area, created by digging into the slope of the terrace, upon which several inches of gray, friable midden deposits were encountered. About a dozen sherds of very crude, thick, oxidized pottery came from this midden deposit. It also contained the densest concentration of most other classes of artifacts and faunal remains, including a few maize cob fragments (Glassow 1980: 72).

Kirkpatrick and Ford (1977: 260) confirmed that there were at least two shallow pit houses at this site, as Glassow suspected. Most metates were of the open-end trough type, but grinding slabs were also present. Botanical materials from this component (NP1E) and from site MP 4 (assigned to the earlier Basketmaker Vermejo phase), were analyzed by Kirkpatrick and Ford (1977: 262-264) and found to contain a wide variety of wild plant species, many of which were possible sources of food. Of even greater interest are their statements:

Corn (a chapalote derivative of *Zea mays*) and beans (*Phaseolus vulgaris*) were recovered

from MP 4 and NP 1E. Corn and bean size variability suggests a wide range of growing conditions and a lack of selection for specific seed type. The presence of a nubbin cob suggests that all growing corn, even tillers, may have been utilized . . . Five of the wild plants represented, lamb's-quarters, pigweed, Rocky Mountain beeweed, sunflowers, and marsh elder are common pioneer plants. Today they grow in farm fields, along roads, irrigation ditches, streambeds, and other areas disturbed by nature or man. Prehistorically the plants would have grown around houses, trash areas, fields, and naturally disturbed areas.

Summary

The Early Ceramic period on the Central High Plains was a millenium in which the transition took place from a strictly hunting and gathering life way into one in which the growing of plant foods provided a significant part of the diet. Other cultural innovations included the introduction of the bow and arrow, pottery, more substantial dwellings, and the beginning of semipermanent villages. The populations were apparently a continuation of the previous Archaic groups. The cultural innovations, however, most probably had their roots elsewhere. Throughout most of the Central High Plains the Early Ceramic complexes can be seen as an extension of Woodland traits and complexes from farther east, that became more and more attenuated as they moved west to and beyond the limits of simple horticulture. In the extreme southwestern corner of the Central High Plains, in the foothills of northeastern New Mexico, the Early Ceramic complexes appear to have had their roots in the Southwest with incipient horticulture possibly preceding pottery making in the area. The end of the Early Ceramic period, a thousand years ago, saw a relatively abrupt transition, probably triggered by innovations from the Southwest, to a horticultural, small village way of life, but with no significant movements of people.



Figure 1. The Red Smoke site (25 FT 42), western Nebraska. The main occupation levels were about a meter above the heads of the figures. University of Nebraska State Museum excavation. Photo by author.



Figure 2. The Lindenmeier site, northeastern Colorado, about 50 years after excavation by the Smithsonian Institution. The occupation level was buried in this terrace. Photo by author.



Figure 3. The Clary Ranch site (25 GD 106), western Nebraska. The occupation level, partly exposed just above creek level to the left, extends into the terrace to the right. University of Nebraska State Museum excavation and photograph.



Figure 4. The Signal Butte site (25 SB 2), western Nebraska, during reexcavation in 1950. Note the well-defined cultural levels. John L. Champe photograph.



Figure 5. The Woodruff Ossuary (14 PH 4), northwestern Kansas. This heavily beaded adolescent skeleton was the principal burial in this Woodland ossuary. Nebraska State Historical Society photograph.



Figure 6. The Larned site (14 PA 307), western Kansas. Note the closely spaced occupational levels, each of which was associated with a Great Bend house floor. Excavation supervised by Earl Monger, in photograph. Photo by author.



Figure 7. Woodland pottery vessel from the Schultz site (25 VY 1), central Nebraska. The Valley focus, for which this is the type site, is the best known Plains Woodland complex. Nebraska State Historical Society excavation and photograph.



Figure 8. Upper Republican phase pottery vessel from the Reams Creek site (25 FR 8), southern Nebraska. Note the distinctive cord roughened surface. Nebraska State Historical Society excavation and photograph.



Figure 9. Upper Republican phase pottery vessel from the Rebecca Creek site (25 FR 6), southern Nebraska. The well-defined collared rim is characteristic of many Upper Republican vessels. Nebraska State Historical Society excavation and photograph.



Figure 10. Pawnee pottery vessel from the Linwood site (25 BU 1), central Nebraska. The decoration on the shoulder area and tall rims are common on Pawnee pottery. Nebraska State Historical Society excavation and photograph.



Figure 11. Dismal River Apache pottery vessel from the Lovitt site (25 CH 1), south-western Nebraska. The simple stamped surface treatment is characteristic of various protohistoric Plains complexes. Nebraska State Historical Society excavation, John L. Champe photograph.



Figure 12. Iron trade axe from White Cat Village (25 HN 37), southern Nebraska. This was found driven into the hearth of a burned house which had been occupied near the end of the Dismal River aspect. University of Nebraska Laboratory of Anthropology excavation. Photo by author.



Figure 13L. Apishapa phase ruin at the Cramer site (5 PE 484), southeastern Colorado (panorama continued on opposite page). Note the massive walls of vertically set rock slabs. University of Nebraska excavation and photograph.



Figure 14. Apishapa phase ruins at the Juan Baca site (5 LA 1085), southeastern Colorado. The most common sites contain 2 to 4 circular rock structures. University of Nebraska State Museum survey and photograph.



Figure 13R. Apishapa phase ruin at the Cramer site (5 PE 484), southeastern Colorado (panorama continued from opposite page). Note the massive walls of vertically set rock slabs. University of Nebraska excavation and photograph.



Figure 15. Apishapa phase ruins at the Snake Blakesley site (5 LA 1247), southeastern Colorado. Note the variety of construction styles, including the stone pillars. University of Nebraska State Museum survey and photograph.



Figure 16. Upper Republican phase earth lodge at site 25 HN 44, southern Nebraska. University of Nebraska Laboratory of Anthropology excavation and photograph.



Figure 17. Upper Republican phase earth lodge at site 25 HN 44, southern Nebraska. This is the largest reported Upper Republican earth lodge and is also unusual in that it has six, unusually large center posts. University of Nebraska Laboratory of Anthropology excavation and photograph.



Figure 18. Pawnee earth lodge at the Hill site (25 WT 1), southern Nebraska. Note the circular shape and the eight center posts which distinguish Pawnee from prehistoric earth lodges. Nebraska State Historical Society excavation and photograph.



Figure 19. The Dismal River Apache house floor at White Cat Village (25 HN 37), southern Nebraska. Dismal River houses are distinctive on the Plains in that they have five main support posts plus two entrance posts. University of Nebraska Laboratory of Anthropology excavation and photograph.



Figure 20. Apache tipi ring, 17th century, at the Chapman site (29 SM 32), northeastern New Mexico. This site, with its more than 200 tipi rings, probably was a stopping place for Apaches going to Pecos pueblo to trade. Northern Illinois University Anthropology Museum excavation. Photo by author.



Figure 21. Apache pit house, ca. AD 1700, at the Sammis site (29 CX 68), northeastern New Mexico. This was one of several styles of houses reported by the Spanish for the ancestors of the Jicarilla at this period. Northern Illinois University Anthropology Museum excavation. Photo by author.



Figure 22. Apache pueblo, ca. AD 1700, at the Glassrock site (29 Mo 20), northeastern New Mexico. This style of architecture was obviously borrowed from the Pueblo Indians with whom the Apaches had extensive contact. Northern Illinois University Anthropology Museum excavation. Photo by author.



Figure 23. Ruins of a Jicarrilla Apache structure at the John Alden site (29 SM 72), northeastern New Mexico. This site was probably occupied only during the winter of 1849-1850 by Chacon's band. Northern Illinois University Anthropology Museum excavation. Photo by author.



Figure 24. Petroglyphs, probably Apishapa phase, on the terrace below the Cramer site (5 PE 484), southern Colorado. University of Nebraska State Museum survey and photograph.

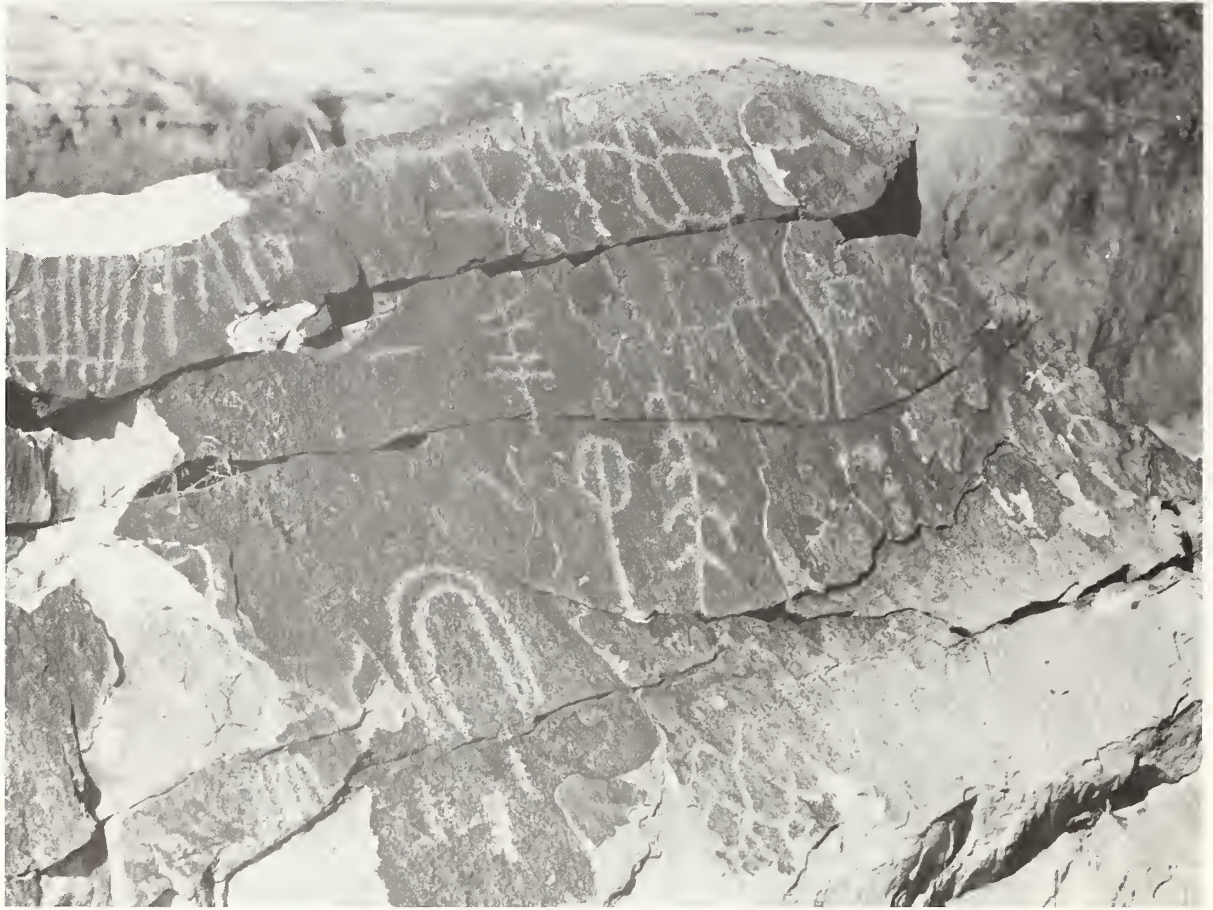


Figure 25. Petroglyphs, probably Apishapa phase, near the mouth of the Apishapa Canyon, southeastern Colorado. University of Nebraska State Museum survey and photograph.

CHAPTER FOUR

THE MIDDLE CERAMIC PERIOD

At the beginning of the Middle Ceramic period marked changes appeared in the cultures of the plains Indians. Whereas people of the Early Ceramic period had only incipient horticulture and simple structures, Middle Ceramic people were producing substantial amounts of corn and living in well-constructed dwellings that conformed to set patterns. It seems highly probable that the Middle Ceramic archeological complexes of the Central High Plains represent development, in situ, from Early Ceramic complexes. The changes in subsistence economy and type of habitation may well reflect the introduction of a new race of maize with a low row number as postulated by Galinat and Gunnerson (1963). The new maize produced substantially higher yields than previous races and was easier to grind. The apparent population increase during the Middle Ceramic probably reflects this more abundant food. The idea of structures built over shallow pits with four-post roof supports probably diffused, along with the new maize, into the plains from the Southwest. In the extreme southwest corner of the Central High Plains there is a comparable and simultaneous cultural florescence, but with a definite Pueblo base and character.

Other cultural changes documented in the archeological record include the appearance of small triangular projectile points, commonly with side notches and sometimes with a basal notch as well. These are good time markers and may have evolved from the Avonlea point as suggested by Kehoe and McCorquodale (1961). However, the route(s) of diffusion is not clear. The small points were undoubtedly used on arrows propelled by bows, weaponry that seems to have appeared on the plains and in the Southwest during the Early Ceramic period.

Excepting the clearly Pueblo manifestations, the Middle Ceramic complexes of the Central High Plains are affiliated with the plains village pattern; however, the farther west the site, the less complete the assemblage. Influence from the northeast is reflected in the elaboration of pottery decoration and diffusion from the southeast is evident in certain traits of the Southern (Death) Cult. The change in vessel shape from tall, pointed-bottom pots, to more nearly spherical forms could be attributed to influence from the East, but more probably came, along with the new maize, from the Southwest. Pottery transitional between the Early and Middle Ceramic periods is apparently represented in the

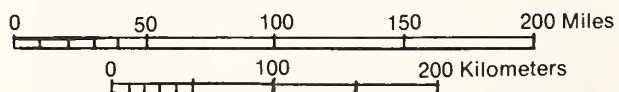
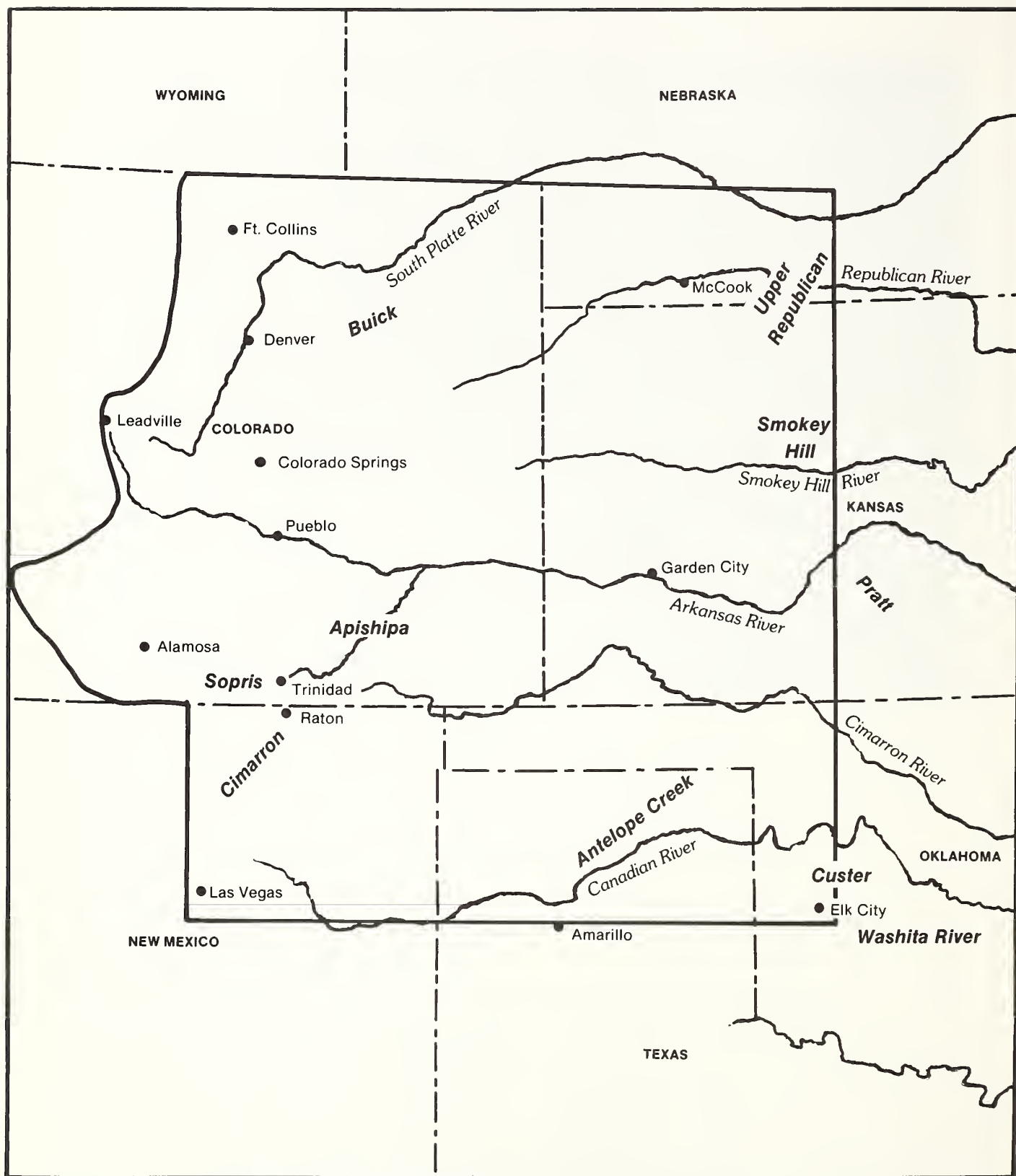
Franktown and possibly the Apishapa phases of eastern Colorado, in the Custer Phase of western Oklahoma, in some of the most aberrant Upper Republican sites in southern Nebraska, in several unexcavated sites in west-central Kansas and possibly in the Smoky Hill phase of south-central Kansas.

During the Middle Ceramic period, there was climatic fluctuation, as demonstrated by tree rings, of a magnitude that would have jeopardized marginal horticulture. As drought hit one sub-area after another, there were apparently concomitant population shifts within the Central High Plains and at the end of the Middle Ceramic period there probably were especially severe droughts that resulted in marked depopulation of the region.

Upper Republican Aspect

The Upper Republican aspect, perhaps the most distinctive cultural climax in the Central High Plains, is best represented in its northeast corner. Here, between about A.D. 1000 and 1450, there developed a sedentary culture based on a combination of horticulture and hunting. It was characterized by distinctive cord-roughened pottery and semisubterranean earth lodges, located either singly or in small clusters. Initially, Strong (1935) was inclined to call this complex "Prehistoric Pawnee." His guess was probably correct, but Wedel's suggested designation, "Upper Republican" aspect, was more acceptable because it was free of interpretation and it soon became established. Many Upper Republican aspect (phase) sites have been excavated, but relatively little of this work has been reported in the literature. Enough information is available, however, to permit valid generalizations.

In spite of several efforts to define temporal and geographic subdivisions of Upper Republican, there is still no generally agreed-upon taxonomic scheme for classifying its manifestations. The various taxa mentioned in the literature include the term "Aksarben aspect," which has been proposed to subsume both the Upper Republican aspect and, to the east of the Central High Plains the Nebraska Culture (aspect). A slightly more inclusive taxon, the Central Plains phase (or tradition), would include the Smoky Hill phase of Kansas in addition. The "Plains Village pattern" would include all the above plus the Apishapa, Custer, Washita and Panhandle



SELECTED MIDDLE CERAMIC COMPLEXES

aspects to the south, and those Middle Ceramic period villages farther north along the Middle Missouri River. There is some resistance, however, to extending the Plains Village pattern west into the High Plains, where, at most, there are isolated earth lodges and not the clusters of dwellings that the name "village" brings to mind. Since these western manifestations are apparently peripheral expressions of the Central Plains phase and the Plains Village pattern, rather than independent cultural complexes, one can better understand the cultural dynamics involved by considering them along with those broad taxa.

Proposed divisions within the Upper Republican aspect (phase) are even less generally accepted. The assignment to the Smoky Hill aspect of sites in north-central Kansas once classified as Upper Republican, has gained support. The separation of the remaining Kansas and Nebraska sites into an early (Solomon River) phase; a middle (Classic Upper Republican) phase; and a late (Loup River) phase (which corresponds closely to what was once called the Sweetwater focus) shows promise but is less well accepted. Two foci have been proposed for Upper Republican aspect sites in Colorado: the Buick focus, in the drainages of the Republican and Platte Rivers, which appears to correspond to at least Classic Upper Republican, and the Franktown focus, southeast of Denver, which may be transitional between Early and Middle Ceramic complexes and, if so, might correspond to the Solomon River phase farther east. Unfortunately, very little work has been done at Middle Ceramic sites in Colorado north of the Arkansas River. As will be seen later, one of the big problems in establishing temporal divisions is the apparent inaccuracy of and inconsistency in radiocarbon dates for the past two millennia. Unfortunately there are very few dendrochronology dates from the plains.

This discussion of Middle Ceramic complexes in the northern Central High Plains will focus on the Classic Upper Republican phase, since that represents the sites for which the literature is richest. Much of what is presented will also be applicable to those other complexes in Nebraska and Kansas that were originally included in the Upper Republican aspect. Limited information on the Loup River, Solomon River and Smoky Hill phases will also be presented even though these taxa may eventually prove invalid. The Buick and Franktown phases of Colorado (if these are valid taxa) apparently represent quite different cultural activities than those going on in the Classic Upper Republican heartland; thus the generalizations do not extend to them. The Buick phase is used as something of a catchall for Middle Ceramic sites north of the Arkansas River in Colorado. The poorly known Pratt complex of south-central Kansas is dealt with separately even though it is apparently in some way related to the Upper Republican aspect.

History of Investigations

Strong (1933) originally defined the Upper Republican culture, later to be renamed the Upper Republican aspect, and presented a list of its distinctive traits. He suggested that it was prehistoric Pawnee and distinguished it from the "Nebraska Culture," which had been described by Gilder (1926) and most extensively investigated by Sterns (1915a, 1915b). Strong's brief article in the *American Anthropologist* (1933) presented a summary of two longer monographs then still unpublished by Wedel (1936) and Strong (1935).

In 1933, the Nebraska State Historical Society initiated an archeological survey of south-central Nebraska (Wedel 1934a,b,; 1935a,b) in the course of which excavation was carried out at a number of Upper Republican sites. A few of these lie just east of the present study area, but most are within it. In all, thirteen houses were excavated representing nine sites. Of these, nine were rectangular; the others were circular or oval. Most of the circular structures were at sites east of the present study area and the most anomalous houses had fewest diagnostic artifacts.

Also in 1933, the Nebraska State Historical Society excavated at three Upper Republican sites along Medicine Creek, a few kilometers south of Stockville, Nebraska (Wedel 1934b). Here, at the Gammill-Phillips site, one small, nearly round earth lodge with four center posts was excavated. The house found at the Thompson site was nearly square but again had four center posts. Remnants of two houses of uncertain shape, and of a square house with rounded corners were investigated at the Owens site. The latter is unusual in that there were 12 center posts forming essentially a circle; a well-defined entrance extended to the east.

Wedel (1935a) alludes to numerous Upper Republican villages in Franklin and Harlan Counties, Nebraska. Strong (1935: 74-103) reports two square earth lodges from the Lost Creek site in Franklin County. Hill and Metcalf (1942: 159) merely mention extensive tests in an Upper Republican site on the Frenchman River, presumably in Chase County, Nebraska.

As part of salvage operations prior to the construction of the Medicine Creek Dam in Frontier County, Nebraska, the Nebraska State Historical Society and the Missouri River Basin Survey excavated 42 earth lodges at 12 Upper Republican sites (Kivett 1949a). Kivett gives a good general summary of the data recovered, but does not provide a detailed house-by-house description; all houses, however, were reported as rectangular. More recently, an additional rectangular house from this same area was excavated and reported in detail (W.R. Wood 1969a).

As part of salvage operations in the late 1940s and early 1950s, the University of Nebraska

Laboratory of Anthropology excavated all or parts of five Upper Republican houses at three sites in the Harlan County (Nebraska) Reservoir area. One, at 25 HN 44, was unusual in that it was (and still is) the largest ever excavated; the rectangle formed by the outer posts was 11 by 14.6 m and contained six very large center posts. The other house at 25 HN 44, also with six foundation posts, was 10.7 x 11 m (Wedel 1953b: 92-93; Cooper 1955: 94-96; Roll 1968: 60-65).

In 1961-1962, the Nebraska State Historical Society conducted salvage archeology in the Red Willow Reservoir area, primarily in Frontier County, Nebraska. The one square Upper Republican house excavated was reported by Grange (1980: 49-70, 155). He states that most of the 30 Upper Republican sites in the Reservoir area were "earth lodge hamlet or village sites."

The one Upper Republican site within the present study area at which structures have been found and reported on is the Pottorff site in the extreme western part of Lane County, Kansas (Wedel 1959: 784-788). The structures here had four center posts but were small and poorly defined. Pottorff is considered by Witty (1978) to be the westernmost Upper Republican site with structures in Kansas, and by Wedel (1959: 569) to be the southernmost Upper Republican site.

Sites in western Kansas presumed to be camps rather than villages have also been assigned to the Upper Republican aspect. Bowman (1959a-c, 1960a-c) reports an Upper Republican component at the Coal Oil Canyon rock shelter (14 LO 1), located in extreme western Logan County, southeast of Wallace, Kansas. An Upper Republican occupation was also reported from site 14 SC 302, in the mouth of Timber Canyon at the north end of Scott County State Park (Witty 1975: 4). From site 14 SC 3 (Wedel 1959: 476), at the extreme southern edge of Scott County, have come Upper Republican sherds, along with various other types. Some of the sherds apparently resemble the orange cord-roughened pottery that Wedel attributes to the Smoky Hill aspect. Near this site, known as Pony Mound, are depressions or playas which may have been the attraction for the diverse groups that frequented the area. The Schmalzried site (14 LA 305) occupies a hilltop in Lane County, Kansas (Stein 1978); nearby is an undrained depression that becomes a playa in wet years. Another hilltop site (14 GL 417), this one in Greeley County, extreme western Kansas (Cheney 1977), has yielded pottery that is either Upper Republican or an unnamed type that appears to be intermediate between Upper Republican and Woodland. A wide variety of points apparently ranging in time from Archaic to Late Prehistoric have been found at the site.

The known distribution of Upper Republican villages almost certainly reflects a biased sample. Numerous sites have been excavated along the Re-

publican River and its tributaries in south-central Nebraska, but apparently only one Upper Republican earth lodge site has been reported from that portion of Kansas which lies within the study area. Some 48 km east of the study area in northern Kansas another concentration of Upper Republican villages has been investigated and reported. Witty (1978) alludes to Upper Republican sites in northwestern Kansas, but apparently none has been excavated and reported in the literature. Although the aspect was defined on the basis of work done by the Nebraska State Historical Society and the University of Nebraska in the 1930s, most of the excavation of Upper Republican earth lodges in both Nebraska and Kansas has come about through later salvage projects prior to the construction of dams.

Subsistence

The Upper Republican subsistence pattern has long been recognized as about equally composed of cultivation (corn, beans and squash) and hunting and gathering, with an emphasis on bison but with a wide variety of plants and animals utilized. Grange (1980: 67) calculated that 98.3% of the meat consumed at 25 FT 32 was from bison with only five other species represented. Falk (1969), however, reports 33 species from 25 FT 35. He did not try to calculate the percentage of usable meat represented by each species, but bison was clearly the most abundant. Deer was also very well represented; rabbits were the most common small mammal. Remains of freshwater mussels and various game birds are frequently present, as are fish bones and fish-hooks.

Of the vegetal materials recovered from Upper Republican sites, several are clearly cultigens. For the Medicine Creek area, Kivett (1949: 280-282) reports that "charred corn kernels were plentiful at all of the sites and some short cobs bearing 6 to 12 rows of kernels were found. Other charred materials include sunflower seeds, charred nuts, and squash or melon seeds." Cutler and Blake (1969: 61) report cobs with 10, 12 and 14 rows from Medicine Creek and corn grains from 8-, 10- and 12-row ears from Glen Elder (Kansas) Upper Republican sites. Sites excavated by Wedel (1935: 185) yielded quantities of charred corn, including a few six-row cobs, and at one site beans and fragments of squash rind and stem were recovered.

Without quantitative information, the importance of smaller animals in the diet of Upper Republican people is hard to assess. Nor does the presence of a particular animal in the inventory necessarily mean it was used for food. Table 9 lists species represented at various sites.

Settlement Pattern

The settlement pattern of the Upper Republican

Table 9. Upper Republican Subsistence
Specimens from Various Sites

	25FT35 (Falk 1969: 43-51)	Lost Creek (Strong 1936: 100)	Various Nebr. (Wedel 1935: 185-203)	Pottorff (Wedel 1959: 37)	Red Willow reservoir (Grange 1980: 165-173)	Glen Elder reservoir (Roll 1968: 135)	Harlan Co. reservoir (Roll 1968: 135)
Bison	x	x	x	x	x	x	x
Pronghorn	x	x	x	x	x	x	x
Deer	x	x	x	x	x	x	x
Elk (Wapiti)		x	x				
Canid	x	x	x	x	x	x	x
Fox					x		
Raccoon		x					x
Badger				x	x		x
Otter			x				
Beaver	x	x	x		x		x
Small Mammals (General)	x	x	x			x	x
Rats & Mice	x						
Muskrat					x		
Kangaroo Rat	x						
Rabbit (General)							
Jackrabbit	x	x	x		x		x
Cottontail	x	x			x	x	x
Pocket gopher	x				x		
Prairie Dog	x	x		x	x	x	x

Table 9, (continued)

	25FT35	Lost Creek	Various Nebr.	Pottorff	Red Willow reservoir	Glen Elder reservoir	Harlan Co. reservoir
Birds (General)	x	x	x		x	x	
Goose (General)		x			x		
Canada Goose	x						
Duck (General)		x			x		
Mallard	x						
Gadwall					x		
Hooded Merganser	x						
Teal	x						
Turkey							
Ruffed Grouse				x		x	
Prairie Chicken		x	x		x		
Hawk	x				x		
Owl	x				x		
Turtle	x		x		x	x	x
Snake	x					x	x
Lizard	x						
Frog	c						x
Fish (General)	x					x	
Catfish	x					x	
Crayfish	x						
Mollusca	x	x	x	x	x	x	x

aspect, particularly the Classic Upper Republican phase, is one of widely dispersed houses on terraces overlooking easily tillable bottom lands along small permanent streams. One or a few houses may occur within tens of meters of one another, but be separated by a few hundred meters from the next house or groups of houses. Houses found at the same site may or may not have been occupied at the same time; there is no clear evidence in the literature of contemporaneity in such situations. Sites are often on second or third terraces and may be several hundred meters from a stream. They are never in a location where they would be threatened by flood. There is no evidence of stockades or other defensive features and no suggestion that sites were selected for their defensibility. Krause (1970) has suggested that Upper Republican sites can be characterized as either "hamlets" or "homesteads," each type occupying a somewhat different kind of terrain and showing a chronological or evolutionary dimension that differentiates it from the other. However, this interpretation does not seem to be generally accepted.

At Upper Republican sites outside the classic area, one finds some differences in settlement pattern. In the Loup River drainage (Ludwickson 1978) sites also occupy ridge tops, reminiscent of some Nebraska aspect sites. At least one site, 25 HW 6, where 22 houses were excavated, was a much larger village reminiscent of the later nearby Lower Loup aspect and of Pawnee villages. Large villages are also found in central Kansas at the Minneapolis and Whiteford sites, which Wedel once considered Upper Republican, but has more recently (1959) placed in the Saline focus of the Smoky Hill aspect. There is still doubt as to whether Smoky Hill should be considered a separate aspect (phase) or be lumped with Upper Republican. In any case, within Classic Upper Republican, the most houses excavated or recorded at any one site is apparently eight, at 25 FT 13 (Wedel 1953a: 14).

Houses

Of more than 130 excavated houses assigned to Upper Republican or closely related complexes only 16 are described in print in any detail and of these 16, only two have been reported since 1935. The houses that remain undescribed have all been excavated since 1935; about half have been excavated since World War II.

Upper Republican houses were earth-covered, built on the surface or over shallow pits, rarely more than .5 m deep and up to 14 m across. These structures were square to rectangular, usually with all four corners square, but occasionally with the two back corners rounded. A long (up to 5 m) covered entrance extending from the middle of one of the sides was commonly oriented more or less to the south or east, away from the prevailing winter wind,

and/or downhill if the site had a significant slope. In contrast to later Pawnee lodge floors, which were covered with puddled clay fired before the posts were set, Upper Republican floors were not thus prepared. In the center of the floor was an unlined fire basin or hearth, up to .3 m deep and 0.6 to 1.0 m in diameter. Rarely, two hearths are found in a house. A smoke hole was left in the roof directly over the hearth. Usually four center posts, but occasionally six and rarely more, stood about halfway between the hearth and the corners of the lodge and provided the main support for the roof. The walls and the entrance passage were defined by smaller and more closely spaced vertical posts. The center posts were joined by stringers which in turn supported rafters that extended to the walls. The roof consisted of small poles and grass, with a covering layer of earth or sod. Excavation of burned lodges has produced large quantities of pole-and-grass impressed burned daub. In addition to the basic four or six center posts and wall and entrance posts, one usually finds miscellaneous holes for posts whose function is not obvious. Occasionally posts were doubled, presumably to provide extra support for a heavy roof. Rebuilding of an old lodge, or the building of a new house where an earlier one has stood, leads to confusing post patterns.

Other common features found in Upper Republican earth lodges are storage pits dug into the floor. These are bell-shaped, up to 1.5 m in depth and maximum diameter, and occasionally have a second (secret?) pit dug into the bottom. The basic function of these "cache" pits was storage, presumably for corn and/or other foodstuffs, but they were sometimes used later for the disposal of trash. Cache pits are found between houses as well as inside them. Middens are commonly found just outside lodge entrances.

There have been attempts to correlate house size and/or shape with chronological status but none has been very successful. This may in part reflect the inaccuracy of radiocarbon dating, which has generally been used to provide time dimension. Furthermore, the time span for Upper Republican culture is probably less than 400 years, so that with standard deviations of up to 100 years on dates, radiocarbon dating is not really precise enough; it is not uncommon to have multiple dates from a single structure that differ by a few hundred years.

Upper Republican Pottery

The most thorough description of Upper Republican pottery is that by Sigstad (1969). Although based on pottery from a single site, his description can be considered representative because Upper Republican pottery is very homogeneous from site to site. Furthermore, for present purposes, it is fortunate that Sigstad's site, the Mowry Bluff site on Medicine Creek in southern Nebraska, is not only

within the limits of the present study area but is in that portion where by far the greatest concentration of Upper Republican sites occurs.

Other Artifacts

General descriptions of artifacts are presented by Wedel (1959: 95-97) for the aspect as a whole and by Kivett (1949: 280-282) for sites in the Medicine Creek Reservoir. More detailed descriptions of artifacts from specific sites can be found in Strong (1935), Wood (1969), and Grange (1980).

Upper Republican chipped stone artifacts show reasonable skill. The projectile points are small, thin and delicately chipped. Typically they are triangular, with straight to slightly convex edges and straight bases, and with side notches about $\frac{1}{3}$ to $\frac{1}{4}$ of the length from the base. There may be, in addition, a single small basal notch. Some points have no notches; rarely, there are two notches on each side and one in the base. Occasionally, points toward the larger end of the size range have only small corner notches. Most projectile points measure between 1.5 to 4 cm in length. The length/width ratio ranges from little more than 1 for some of the shorter points to nearly 2.5 for some of the longer ones. The projectile points show a marked contrast to the deeply corner-notched (stemmed) points of roughly the same size and proportions found at Early Ceramic period sites, but Upper Republican points are indistinguishable from those of various protohistoric complexes.

The question of the chronological and cultural position of the small delicate triangular projectile points with straight to slightly concave bases is a significant one. Of special concern is the presence or absence of side and basal notches. These points were classified by Strong (1935: 88) as types NBA, NBA1, NBA2, NBA3, NBA4, NBB, NBB1, and NBB2, designations commonly found in the older literature. Points of these NB types are characteristic of the Middle Ceramic period where, in Upper Republican assemblages, for example, they showed greatest variety. Points of the Early Ceramic period are characteristically small to medium-sized expanding-stem or corner-notched varieties, but triangular unnotched or side-notched types may have made their first appearance then. Triangular side-notched points of small to medium size found in the northwest Plains have been named Avonlea points by Kehoe and McCorquodale (1961), who see them as time markers. They consider these points the earliest small points in the northwest Plains, appearing there by A.D. 460. Avonlea points are cruder, and tend to be larger and stubbier, than the delicate triangular points of the Middle Ceramic period of the Central Plains, but they could conceivably be the type out of which these later points evolved. Another, earlier, Archaic type of small side-notched point, in this case with basal notches also, is well represented

in Signal Butte I (Strong 1935: 233, Plate 25-1-e). Such points seem out of place in this early context (1000-1500 B.C.) and appear to have no more than a coincidental resemblance in general outline to the Middle Ceramic period points.

Small, delicate, triangular points persist into the Late Ceramic period. Great Bend (protohistoric Wichita) points are commonly triangular and unnotched, secondarily side-notched. Occasionally a basal notch occurs with side notches (Wedel 1959: 265, 314, 576). In Lower Loup (protohistoric Pawnee), on the other hand, unnotched points are typical (Dunlevey 1936: 194). These persist as a minority type into historic Pawnee, where notched points become typical even as stone points become uncommon (Wedel 1936: 75, 1938). The Dismal River aspect (protohistoric Apache) had both unnotched and side-notched points, indistinguishable from those of Upper Republican and Great Bend (Gunnerson 1960, 1968; Wedel 1959; Hill and Metcalf 1942). Strong (1935: 90, citing A.T. Hill) attributes points with both side and basal notches to Dismal River, but this occurrence has yet to be confirmed.

One of the more distinctive chipped stone tools found in the Upper Republican complex is a diamond-shaped, alternately beveled knife also found in the Great Bend, Lower Loup, Custer, Washita River, Panhandle, and Pratt complexes. These are often referred to in earlier literature as "Harahey knives" (Harahey being a phonetic rendition of the Pawnee name for themselves). When first made they are commonly as much as 15 cm long and 8 cm wide. After repeated resharpening, and before being discarded, they are sometimes half their original length and so narrow that they resemble double-pointed drills. These knives, like those of a variety of less distinctive shapes (triangular, rectangular, oval) are relatively thin, well-made and bifacially chipped. Presumably also used for hide working were small plano-convex, snub-nosed end and side scrapers comparable to those found at Lower Loup and Great Bend sites. These are more carefully made and tend to be smaller than those found at Dismal River sites. Chipped stone drills are "T"-shaped, have expanded bases, or are made from the base portion of projectile points. Drills are not common at Upper Republican sites. Other chipped stone artifacts include chipped celts or axes and large, thick bifaces. Miscellaneous flakes show signs of retouch and/or use.

Ground stone artifacts commonly found at Upper Republican sites include shaft smoothers almost always made from Dakota (red) sandstone and presumably always used in pairs. These are rectangular, with somewhat convex sides and a longitudinal U-shaped groove in one face. Some are well-finished on all surfaces. At one time these were called "nail buffer" shaft smoothers because of similarity in shape to devices commonly used by women in the 1920s and 1930s for polishing fingernails. Also

commonly found are irregular pieces of sandstone or other gritty stone with grooves worn in them, presumably from sharpening, shaping or smoothing other artifacts of stone, bone, wood, antler, etc. Metates or milling slabs, with either a shallow basin or a trough open at one end, and manos, usually a conveniently shaped cobble, occur in the southwestern portion of the Upper Republican area, perhaps reflecting availability of suitable stone and/or proximity to the Pueblo Southwest. Upper Republican and related people to the northeast probably used wooden mortars and pestles for corn grinding: some "post holes" between the hearth and entrance of earth lodges have been interpreted as mortar holes. Battered river cobbles appear to have served as hammerstones. Ground and polished celts, grooved axes and grooved mauls were apparently not produced by Upper Republican people.

Among the more finely made ground stone artifacts are pipes, usually elbow. Sometimes the distal end of the stem or base portion extends beyond the bowl to form something of a pointed prow. Bowls and stems are round to rectangular in cross-section, and in some cases the outside diameter of the bowl is greater at the top than where it is attached to the stem portion. Occasionally pipes are decorated with incised lines; only rarely is the bowl in the form of an effigy, *e.g.*, a bird. Pipes made of clay, although not as common as ones of stone, are generally the same form (equal-armed elbow) and size (about 5 to 8 cm long).

Highly characteristic of the Upper Republican artifact assemblage is the bison scapula hoe with the spine and sometimes the glenoid cavity removed. Hoes made from a section of bison skull with part of the horn core attached, and bone tips for digging sticks, both found in contemporaneous complexes in the Southern Plains, are rare or missing in the Central Plains except at the southern edge. Other bone tools include various types of awls, eyed needles, fishhooks, shaft wrenches made from long bones or bison ribs, picks made from bison ulnae, sections of bison rib slotted to serve as handles for stone knife blades, perforated deer toe bones which presumably served as ornaments or plume holders, deer or antelope mandibles probably used as sickles or corn shellers, beamers or dehairing tools made from spines of bison vertebrae, and knives made from sections of scapulae. Tubular bone beads are also found.

Shell, presumably local, was made into biconical-drilled disk beads. Such beads sometimes accompany Upper Republican burials but in nowhere near the number sometimes found with Woodland burials. Strong (1935: 111-114) reports pendants or ear ornaments made from Gulf Coast conch shells, cylindrical shell beads, presumably also from Gulf conch, and Olivella shell beads.

From the ossuary containing these ornaments of foreign shell, Strong (1935: 111) also recovered a

bracelet or bow guard made from a flat section of a large antler. An outspread hand with a circle (eye?) on the palm was incised at each end. There were lines that could be interpreted as bracelets on the wrists. The "hand and eye" design on this bracelet clearly reflects influence from the Southern Death Cult; the bracelet and Gulf Conch ornaments together suggest that a complex of Southern Cult traits had diffused to Upper Republican.

Other antler artifacts more common in Upper Republican sites are cylinders, clubs, small flat pieces that may have been parts of bracelets, awls, possible handles for stone tools, possible stone flaking tools, and shaft wrenches.

Burials

Upper Republican people used at least two methods for disposal of the dead: individual primary (flesh) interments and ossuary burials. Various bits of information indicate that there were also ceremonies involving the dead that were related to the Southern Death Cult.

About 13 km southeast of Alma, Nebraska, Strong (1935: 103-114) excavated the Graham site, an Upper Republican ossuary. Here a pit of about 8 m square and 1.15 m deep had been dug into the top of a prominent hill overlooking the confluence of Prairie Dog Creek and the Republican River. Into it had been thrown the disarticulated skeletons of many individuals and a variety of artifacts. Many of the bones had been lightly burned, perhaps from having been exposed to prairie fires prior to burial. There was no evidence that the burning had taken place in the pit, although specks of charcoal were found throughout the fill. With the exception of two articulated infant skeletons, the bones revealed no indication of order, either anatomical or artificially imposed. Numerous rocks of various sizes were also found in the fill; these were foreign to the hilltop and their function in the ossuary was not obvious. More than 900 potsherds were recovered from the pit, nearly all of them matching the pottery from an Upper Republican house a few kilometers away. Other artifacts found included a small elbow pipe of white stone, broken sandstone shaft polishers, six small, delicate projectile points (five side-notched and one unnotched), two small well-made end scrapers, a bone shaft wrench, a well-made bone awl, and two bone beads. All of these are characteristic of Upper Republican sites in general. Several other specimens are of special interest in that they are rare or unique in this complex and indicate connections with the Southern Death Cult. Among them is an antler bracelet or bow guard, previously described, with the hand and eye motif. Ornaments of Gulf coast conch shell included two long pendants and 11 smaller pendants; 85 cylindrical beads were probably also made from conch shell. Another piece of worked conch shell may have been the bowl

of a spoon. Two perforated copper disks were apparently coverings from decayed wooden ear spools. Extensive trenching on this and a nearby hill failed to locate any additional pits.

Wedel (1935a: 174-175) reported five burial pits at the Holdrege 5 site a few kilometers from the Graham ossuary. Two of the pits had apparently contained two individuals each, whose remains had since been removed; two contained partial skeletons representing flexed burials, and the fifth, a small ossuary, contained the jumbled bones of several individuals and numerous shell beads. The pits were from 0.8 to 1.5 m in diameter and 0.5 to 1.1 m deep. Presumably the skeletons had been buried intact at time of death and later transferred, in a jumble, to the ossuary pit. The flexed primary burial of a young child was found at the Gammill-Phillips site on Medicine Creek (Wedel 1934b: 148).

In spite of extensive work carried out in the Medicine Creek Reservoir (Kivett 1949), only one skeleton probably attributable to the Upper Republican occupation was discovered. This, an extended flesh burial of an adult male on a hilltop, was accompanied by a few artifacts such as were found at a nearby Upper Republican village. Scattered human bones were occasionally found in houses, storage pits and middens.

Wedel (1961a: 96) makes the general statement concerning the Upper Republican aspect that in both the Republican and Loup valleys bodies were first exposed and then the bones were gathered up and placed in large communal pits on bluffs overlooking the village sites.

Loup River Phase

A concentration of Upper Republican village sites, centering along the Loup Rivers just to the northeast of the present study area, has been assigned by Krause (1969: 90-91) and by Ludwickson (1975, 1978) to the Loup River phase to distinguish these sites from those of the Classic Upper Republican phase and the Solomon River phase (Krause 1969: 90-91). The Loup River phase includes sites once assigned to the Sweetwater focus by Wedel (1935a: 252) and to the Loup River focus by Strong (1935: 2) and Champe (1936: 283). Although almost all of those Upper Republican aspect sites assigned to the Loup River phase lie just beyond the present study area, it is essential to take note of them in considering the overall Upper Republican problem. Ludwickson (1978: 96) summarizes data from 56 excavated houses representing 20 sites. Data on three of the earth lodges had been published previously (Champe 1936), 12 had been reported in an unpublished MA thesis (Ludwickson 1975), 33 had been described in an unpublished manuscript by the late George Metcalf (n.d.), one is mentioned by Kivett (1952: 44) and information on seven came from field notes. According to Ludwickson (1978)

Loup River phase houses share with Classic Upper Republican houses the four-center-post pattern, but there is a higher incidence of round houses, and these tend to be smaller and deeper than those of Classic Upper Republican. He does not point out, however, that within the Classic Upper Republican area there are more round and deep houses in the eastern part than farther west.

Unfortunately, there are very few dates available for Loup River phase sites. A date of A.D. 1130 \pm 200 years for a large structure on Coufal Ridge in the Davis Creek locality is rejected by Ludwickson because it was determined by the solid carbon method, has a large standard deviation, and comes from a structure that he does not consider assignable to the Loup River phase. Site 25 BF 210 on the Wood River in Buffalo County, Nebraska, considered by Ludwickson (1978: 102-103) to be archetypical of the Loup River phase, has three radiocarbon dates of A.D. 1330, 1480, and 1530, which he accepts, and one of A.D. 1060, which he does not; all are from a single house. A nearby house at 25 BF 145 he assigns to the Upper Republican phase. It has yielded two dates of A.D. 1150, which he accepts, and one of A.D. 690 which he rejects. Ludwickson suggests that the Loup River phase is transitional between Classic Upper Republican to the immediate south and the Lower Loup phase (protohistoric Pawnee) a little way down the Loup River to the east. This possibility had been recognized by Strong (1932, 1935), Wedel (1935a: 174) and Champe (1936: 282) although Wedel (1978: 160) emphasizes that the Loup River phase is much closer to Upper Republican than it is to Lower Loup.

Solomon River Phase

Another concentration of village sites related to Classic Upper Republican lies in a neighboring area. In north-central Kansas, in the Glen Elder Reservoir on the Solomon River, 15 Upper Republican houses were excavated in the mid-1960's by the University of Nebraska (Krause 1970; Lippincott 1978). Houses were the typical square earth lodges, built on the surface, or with only the sod removed from the area within. House floors ranged in size from 30 to 112 square meters. Entrances ranged from 0.5 to about 5 m in length.

Of these 15 Solomon River phase houses, 12 were described briefly by Carlson (1971) who was mainly concerned with ordering them chronologically by means of seriation. Lippincott (1978) presents additional information and points out that the houses, although varying considerably in size and detail of post arrangement, in general represent the standard square earth lodge, and that site location and settlement pattern are typical for Upper Republican sites. He, too, presents the results of site seriation, but on the basis of pottery rim form and lip-rim motifs (in this case computer assisted) as well as a series of

radiocarbon dates. Lippincott concludes that the sites were occupied from approximately A.D. 800-850 to A.D. 1200-1250, that there was not a shift in settlement pattern from hamlets to isolated houses, as Krause (1970) had suggested in a preliminary report of work at these sites. Rather, he notes that both patterns were found throughout the Upper Republican occupation of the Glen Elder area. Also, Lippincott found that house size was randomly distributed through time rather than decreasing in size through time, as suggested by A. Johnson (1973).

Two small Upper Republican houses of the Solomon River phase were excavated at site 14 JW 301, on Buffalo Creek in Jewell County, north-central Kansas, by the Kansas State Historical Society (Witty, personal communication). A radiocarbon date (GaK-593) for this site is A.D. 910 ± 100 , making it one of the earliest dated Upper Republican sites, and supporting the idea that the Solomon River phase may be the earliest Upper Republican phase.

Excavation at the Root site (14 LC 301), on the Saline River in Russell County, central Kansas, yielded one house, square with rounded corners and about 7.3 m across. The site was originally recorded by Solecki (1952: 9) and its excavation is reported by Witty (1962). A radiocarbon date (sample I-509) for the site is A.D. 987 ± 100 (Witty 1962: 30). Witty identifies the pottery as a variety of Riley Cord Roughened described by Wedel (1959: 183-184) on the basis of pottery from the Griffing site (14 RY 21) in northeastern Kansas, which he assigns to the Smoky Hill aspect.

In the reservoir area containing the Root site, Witty (1962) excavated three other sites having Central Plains phase and Woodland occupations. One of these, 14 LC 302, was a rock shelter, and the Central Plains component was assigned to the Aksarben (Upper Republican?) aspect. The other two, 14 RU 302 and 14 RU 303, were open sites; post holes, hearths and pits were found but no houses could be detected.

From the Glen Elder Reservoir area Krause (1970: 107) reports one Upper Republican cemetery on the same terrace as one of the hamlets. Two clusters of burial pits, most of them devoid of bones except for toe and finger bones, were spread around a common burial chamber which contained the disarticulated skeletons of 50 to 60 individuals and two complete pottery vessels. One of the small pits contained the flexed skeleton of an elderly male.

Smoky Hill Aspect

Wedel (1959: 563-565), who defined the Smoky Hill aspect, included in it sites near Minneapolis and Salina, Kansas, which had once been assigned to the Upper Republican aspect. On the basis of admittedly limited data, he has suggested that the Smoky Hill aspect might be ancestral to the Upper Repub-

lican and Nebraska aspects and that it may have been influenced by Plains Woodland cultures. Much of his argument is based on the facts that Smoky Hill vessels are taller and less often decorated than classic Upper Republican pots. He notes the occurrence of distinctive orange-browncord-roughened pottery, which has a strong tendency to spall and occurs over southeastern Kansas and south into Oklahoma. He also reports Spiro focus pottery, presumably from eastern Oklahoma, associated with Smoky Hill burials, and notes similarities between Early and Middle Spiro component houses and Central Plains earth lodges. The possibility that Smoky Hill grew out of a local Woodland complex should be seriously considered.

On the Solomon River, in Ottawa County, Kansas, Wedel (1935: 218-225) excavated at Minneapolis 1, which he described as one of several large prehistoric villages in the area. The three houses uncovered were square, the largest being 16 m across with an entrance 5.2 m long and 1.2 m wide. Six cache pits had been dug through the floor. The floors of all three houses at Minneapolis 1 were at or just below the original surface.

A burial pattern quite different from that of Classic Upper Republican is found at a site near Salina, in central Kansas, about 160 km east of the present study area. This, the Whiteford site, has been excavated privately, leaving the burials in place, and developed as a tourist attraction. Here, a low mound, surrounded by the alluvial bottom land of the Smoky Hill River, has yielded some 140 human skeletons of all ages, both male and female. All apparently had been flesh burials, partially or completely flexed. Most had been placed on their right sides, heads to the south and facing east. Artifacts found in this mass burial parallel those from a nearby village where numerous earth lodges had probably once been present (Wedel 1959: 512-523).

The burials and the village complex, which closely resembles the Minneapolis 1 site about 30 km to the north (Wedel 1934: 218), have been assigned to the Smoky Hill aspect (Wedel 1959: 535).

The Larned site (14 PA 307), just within our study area at the confluence of Pawnee Creek and the Arkansas River in west central Kansas, had as its lowest component a Smoky Hill aspect camp (Monger 1970). It was overlain by Pratt focus, Great Bend aspect and Larned Fine-Line components, in that order, each well separated stratigraphically from the next. The Pratt and Great Bend occupations took place at times when there were repeated floodings, each represented by a silt lens, and followed by a reoccupation of the site. However, there is no indication of flooding during either the Smoky Hill occupation or the period immediately following when 60 cm of fill built up, but apparently not through alluviation. Monger's detailed description of the sedimentation suggests that the Smoky Hill component rested on a well-developed soil, and that

following this occupation, but prior to the Pratt occupation, there had been two stable periods when first a thin soil and then later a thick soil had formed. The Pratt occupation was on top of the thick soil. Although Monger does not so speculate, it seems very probable that we have reflected here two major droughts in the 1400s, perhaps ones recorded in the tree-ring history of Nebraska for A.D. 1439-1454 and 1459-1468 (H. Weakly 1946, 1962; W. Weakly 1961). The second indication of drought at the Larned site might date from the 1500s, but this seems highly unlikely since above it are the Pratt and Great Bend occupations, the latter of which, at least, dates from the 1500s and occurs in a context of wet years (repeated flooding).

A simple, unprepared hearth was found in the Smoky Hill zone at the Larned site, but no other structural features. Near the hearth were three areas of chert chips, identified as work areas, three bone concentrations, and a limited amount of other detritus. Artifacts are described by Monger (1970: 12) as follows:

One pottery vessel, broken and scattered about the area, was gathered and restored. The vessel was completely cord-roughened. Some of the cord marks were obliterated on the bottom and lower sides, and a narrow band, on the shoulder where it joins the neck, had been smoothed and showed polish. The vessel is sherd tempered and the paste is compact and hard. The base of the vessel is almost pointed, the body straight to cone-shaped, the shoulder is rounded and flattens before it joins the neck. The rim is out-flaring and plain.

The pointed base and cone-shaped body suggest that this ware had recently evolved out of a Woodland ware, paralleling what appears to have happened in the Franktown focus farther west.

Other artifacts, not abundant, included small triangular side-notched projectile points, a fragment of a chipped knife, a fragment of a side scraper and a pointed section of a rib, possibly a piercing tool. All the evidence points to a small temporary Smoky Hill phase hunting camp, probably among trees that bordered Pawnee Creek.

Franktown Focus

The Franktown focus was defined by Withers (1954: 2) as follows:

A third group of materials has been named the Franktown Focus. This focus seems to be concentrated in an area southwest of Denver in the timbered uplands along the southern Tributaries of the South Platte River. The commonest variety of Franktown pottery consists of wide-mouthed, cord-marked jars with conoidal bases and incurving rims. The cord markings are almost always partially smoothed. A few sherds show a slight thickening of the

rim. The associated projectile points are usually side-notched and small to medium in size. The entire lithic complex of the Franktown Focus seems closely related to that described for the Upper Republican Aspect. The pottery, too, seems quite like Upper Republican in every characteristic except for the striking difference in vessel form. It may be possible to interpret the Franktown Focus as representing a transitional development from Woodland to Upper Republican in the western Plains.

Apparently the material from Cliff Swallow Cave, about 55 km southeast of Denver, is assignable to this focus (Morton 1954). An analysis of the projectile points from the Franktown Cave was carried out by Pustmueller (1977).

In addition to unquestionably Upper Republican pottery, other similar cord-roughened pottery has been found over much of the High Plains of Colorado and the panhandle of Nebraska. This seems to occur in small amounts, lacks the distinctive colored and braced Upper Republican rims, and in general resembles Woodland pottery as much as it does Upper Republican. There have apparently been no published reports of investigations of sites which yield this ware. Although the pottery could represent a marginal variant of Upper Republican, it more probably represents a transition from Woodland to Upper Republican. Such ware may also occur farther east but with the abundance of other cord-roughened pottery it could well have gone unnoticed. This ware, like that of the Franktown focus, has been tentatively called "transitional," and may be related to it. Any manifestations that show promise for bridging the apparent hiatus between Woodland and Upper Republican deserve close attention.

A possible Franktown focus component at the Spring Gulch site (5 LR 252) was suggested by Kainer (1976: 196). This site is located almost at the Wyoming border, approximately straight north of Denver, Colorado. Since the site is stratified, and there is some mixing between levels, it is not certain which other artifacts belong with this component, but both corner-notched and side-notched projectile points appear to be associated.

The Franktown focus may also be represented at the Jarre Creek site, just southwest of Denver, which has been dated by radiocarbon at A.D. 1050 \pm 250 (G. Scott 1963: 48).

Buick Focus

The Buick focus, apparently a local manifestation of the Upper Republican aspect, was defined by Withers (1954: 2) as follows:

Other materials related to the Upper Republican Aspect in eastern Colorado arrange themselves into two foci. In the South Platte and Republican River drainages occurs the

Buick Focus. These materials lap over into the Arkansas drainage in some localities. The commonest pottery is in the form of squat, round-bottomed jars which are cord-marked and have an out-curved rim. Frequently the rim is thickened to form a "collar," and incised geometric designs were placed on these. Plain bowl and "seed jar" forms occur more rarely. Small to medium side-notched projectile points are normally found on these sites. The only architectural remains so far discovered amount to little more than floor areas with hearths.

W.R. Wood (1971) described materials excavated from two Upper Republican sites near Limon in eastern Colorado and called attention to other Upper Republican sites in the High Plains west of the westernmost known Upper Republican earth lodge villages. These sites are in northeastern Colorado, southeastern Wyoming, the southern part of the Nebraska Panhandle, and the extreme southwest corner of Nebraska. Prior to Wood's article very few of these sites had been reported in the published literature, although seven of the Colorado sites had been described by J.J. Wood (1967) in his Ph.D. dissertation, and all (seven) of the Wyoming sites by Reher (1971) in his MA thesis. W.R. Wood (1971) in his study of collections at the University of Colorado, Denver University and the Nebraska State Historical Society, reported eight radiocarbon dates for Upper Republican occupations, having obtained his information from Breternitz (1969: 120-121), J.J. Wood (1967) and Steege (1967). These dates (corrected) range from A.D. 660 to A.D. 1260 with plus or minus factors. Because of the homogeneity of the Upper Republican materials recovered, W.R. Wood (1971) favors an occupation of the area between about A.D. 1200 and 1300.

The Smiley Rock shelter (5 EL 9) is located just east of the tip of Cedar Point, north of Limon in Elbert County, Colorado. In 1952 Herbert Dick directed excavation in this shelter which had apparently been occupied almost exclusively by Upper Republican people. W.R. Wood classified the majority of the pottery (four rim sherds from four vessels and 25 body sherds) as Cambridge and Frontier Ware, both of Upper Republican affiliation, after Sigstad (1969). Two sherds from the surface of the site resembled those excavated from the nearby Cedar Point village (5 EL 8), which can probably be assigned to plains Apaches. Other artifacts from Smiley Shelter are all typical of the Upper Republican complex: small triangular projectile points with lateral notches (2), end scrapers (2), triangular biface (1), alternate-bevel biface (1), retouched flakes, mano (1), bone awls (2), and bone beads (2). Field notes indicated that bone was common at the site.

The Buick Camp site (5 EL 1), located not far northeast of Smiley shelter, is the type site for the Buick focus of the Upper Republican aspect defined

by Arnold Withers (1954). Withers dug at the site in 1949 and Herbert Dick in 1954. W.R. Wood (1971) reports only the material excavated by Dick and this apparently represents an Upper Republican occupation almost exclusively. The site is a midden about an 0.4 ha in extent and up to 30 cm thick, just under the escarpment of Cedar Point. The midden contained a large amount of bison bone, some of it burned, and Dick excavated a hearth at the base of the refuse. The pottery examined by Wood contained 31 rim sherds representing about 24 vessels, and 145 body sherds which he assigned to Upper Republican wares: predominantly Frontier Ware with one Cambridge Ware rim. Eight body sherds, some cord-roughened and some smooth, could not be identified and were considered as intrusive. The rest of the artifacts described are typical of Upper Republican complexes: small, triangular projectile points, unnotched, side-notched, side- and base-notched and two with corner notches; end scrapers; a graver; a drill; large beveled bifaces including diamond-shaped; various other forms of bifaces; manos; bone awls; and a bone bead. It is probably significant that at neither of these two sites in Elbert County were found bison scapula hoes, so common at Upper Republican earth lodge villages farther east. This strongly supports the probability that, rather than being horticultural villages, these western sites were temporary camps on a travel route from permanent villages to the east.

Upper Republican earth lodge villages are apparently all east of the hundred and first meridian, the westernmost being reported from the Red Willow Reservoir in Nebraska and the Pottorff site in Kansas. West of these villages, however, are camp sites and rock shelters which have yielded Upper Republican pottery. These are either erratically distributed in parts of Wyoming, Nebraska and Colorado, from the North Platte River south to the southern edge of the Republican River drainage, or discoveries have been erratic. Except along the extreme northern edge of Colorado and southeast Wyoming, these sites seem to be no closer than about 80 km to the foothills of the Rocky Mountains (W.R. Wood 1971).

It is generally assumed that these western Upper Republican sites served as temporary camps associated with some activity such as bison hunting. Whereas Upper Republican villages farther east are always in close proximity to good horticultural lands, no such relationship is noticeable to the west. Some of the sites, such as Signal Butte near Scottsbluff, Nebraska, would have served well as lookout points for detecting herds of game. Rock shelters, of course, were highly desirable temporary habitations for people traveling or exploiting some local resource over short periods of time. If these Upper Republican sites west of the one-hundred-first meridian were satellites of permanent villages in this western area, then such permanent villages have yet to be

found. Furthermore, this western High Plains area would not have been well suited for the riverine farming that constituted a significant portion of the subsistence activities of the Upper Republican people. Hence, permanent occupation of the area would have involved a subsistence pattern quite different from that found farther east and one would not expect in such cases the marked similarity in artifacts that is found.

Other Middle Ceramic Sites in Northern Colorado

The Middle Ceramic period in northeastern Colorado is known primarily from the survey and excavations carried out by J.J. Wood (1967). He found that evidence of occupation for this period came almost exclusively from rock shelters, with no instances of permanent habitations. Unfortunately, those rock shelters most used had also been most badly disturbed by several decades of vandalism. And the components yielding the largest collection of pottery (5 WL 37 and 5 WL 43) could not provide radiocarbon dates. The radiocarbon dates J.J. Wood (1967: 628) did get fall in the Middle Ceramic period, but the sites (Uhl, Peavy Rocky shelter, Biggs and Kasper) for the most part presented problems of interpretation. Diagnostic artifacts were lacking, or few, or mixed, and strata 82 were thin. Only at the Peavy Rock shelter was there reasonably clear association of the radiocarbon sample and diagnostic Middle Ceramic period artifacts. Some components were assigned to the Middle Ceramic period solely on the basis of the radiocarbon dates. Wood's data strongly suggest that northeastern Colorado was occupied by Middle Ceramic period people, but only sparsely and intermittently.

A stone ring site from northern Colorado apparently dates from the Middle Ceramic period, but does not suggest Upper Republican affiliation (Flayharty and Morris 1974). The T-W-Diamond site (4 LR 200) consists of 47 stone "tipi" rings, 4.3 to 5.8 m in diameter. Of these 17 were excavated or tested. The only diagnostic stone artifacts were small triangular projectile points, unnotched, side-notched or with side and basal notches. Sherds from one crude, flat-bottomed pottery vessel resembling modern Shoshone ware were also found. Three radiocarbon dates determined on charcoal were A.D. 1020 ± 230 , 1170 ± 220 , and 400 ± 340 . The first two are compatible with the projectile point types but the latter should be rejected because it is much too early (Flayharty and Morris 1974).

The sites most comparable to the T-W-Diamond site thus far reported are two groups of tipi rings, the Piney Creek sites (48 JO 311 and 48 JO 312) in Johnson County, northeastern Wyoming (Frison 1967). These sites are considerably richer in artifacts than the T-W-Diamond site, which in turn is richer than most Plains tipi ring sites. Except for the dif-

ference in artifact yield, the inventories of the three sites are quite comparable. However, the limited amount of pottery from the Wyoming sites is thought to have Mandan-Hidatsa affiliations, whereas the best guess on the Colorado pottery is Shoshone. The buffalo butchering and camp sites on Piney Creek have been dated by radiocarbon at A.D. 1580 ± 100 and A.D. 1610 ± 100 , dates entirely compatible with the chronological status of the small delicate triangular projectile points, most of which had side notches (half had basal notches also). Similar points were found by Frison (1970) in the upper level of the Kobold site (24 BH 406), a deeply stratified buffalo jump in southeastern Montana.

Upper Republican Discussion

Of the various Middle Ceramic Period complexes known in the Central High Plains, the most thoroughly investigated and reported is the Upper Republican phase. There is enough information available, especially if all of the excavated but still unpublished sites were included, for a thorough synthesis. The major questions not yet answered concern the external relationships of the Upper Republican phase to: the Nebraska phase, the Smoky Hill aspect, the Washita River phase, the Panhandle aspect and the various complexes in eastern Colorado that are apparently closely related. More and more it appears that these various complexes grade into one another and that even though their definitions are of use to archeologists, they do not necessarily reflect linguistic or cultural entities that would have been meaningful to the people themselves. All, most probably, were Caddoan speakers ancestral to modern Arikara, Pawnee and Wichita.

At one time, the Upper Republican aspect was interpreted as representing a new group of people who moved into the Central Plains and replaced the earlier Woodland people. The idea is now generally accepted that Upper Republican culture, along with that of the closely related taxa mentioned above, evolved, more or less *in situ*, from earlier local Woodland cultures. Some archeologists, especially Hughes (1974b), sees culture continuity starting at least as early as the Archaic period. It is perhaps significant that in the Upper Republican heartland there has not been a complex clearly identifiable as transitional between Woodland and Upper Republican, such as the Graneros focus in southeastern Colorado or the Custer Phase in western Oklahoma. The Smoky Hill aspect, just to the south of the Upper Republican territory, has been suggested by Wedel (1959: 565) as possibly ancestral to Upper Republican. The idea should be seriously considered that some of the traits that distinguish the Central Plains tradition from the earlier Woodland pattern entered the Central High Plains from the Southwest, were integrated first into the nearest

Middle Ceramic Period
Table 10. Eastern Colorado Radiocarbon Dates
(Butler 1980: Table 2)

Site	Dates B.P. (B.C./A.D.)	Sample Number	Type of Sample	Reference
Site 5 LO 6	545 ± 150 BP (AD 1405)	GX-0564	Charcoal	Wood 1967: 466
Kasper (5 LO 4)	655 ± 250 BP (AD 1295)	GX-0560	Charcoal	Wood 1967: 482, 501
Biggs (5 WL 27)	695 ± 110 BP (AD 1255)	GX-0566	Mammal bone	Wood 1967: 348, 356
Happy Hollow (5 WL 101)	780 ± 90 BP (AD 1170)	Gak-1304	Charcoal	Steege 1967
Biggs (5 WL 27)	735 ± 105 BP (AD 1215)	GX-0567	Mammal Bone	Wood 1967: 348-354
Peavy Rock Shelter (5 LO 1)	810 ± 125 BP (AD 1140)	GX-0317	Charcoal	Wood 1967: 225, 282
Jarre Creek Colo: K: 12: 9 (5 DA 541)	900 ± 250 BP (AD 1050)	W-1018	Charcoal	Scott 1963: 48
T-W Diamond (4 LR 200)	900 ± 230 BP (AD 1020)	A-1273	Charcoal	Flayharty & Morris 1974: 168
Spring Gulch (5 LR 252)	935 ± 140 BP (AD 1015)	UCa-1050	Charcoal	Kainer 1976: 31,215 ff.
Uhl (5 WL 32)	1210 ± 220 BP (AD 740)	GX-0324	Mammal bone	Wood 1967: 182

Table 11
Radiocarbon Dates from Upper Republican Sites

Site	Sample No.	Date (A.D.)	Comments
25 FT 80	UM 468	1445 \pm 295	date on mussel shell
25 FT 17	SI 34	465 \pm 65	
14 ML 5	GaK 810	540 \pm 80	Solomon River Phase (Rejected Lippincott 1978)
25 FT 80	UM 467	570 \pm 180	
14 ML 15	GaK 804	610 \pm 90	Solomon River Phase (Rejected Lippincott 1978)
25 FT 35	GaK 1975	630 \pm 210	
25 FT 70	SI 197	690 \pm 80	perhaps from Woodland component
25 BF 145	GaK 6216	690 \pm 100	Classic Upper Republican (Ludwickson 1978)
5 LO 1	GXO 318	805 \pm 155	
14 ML 17	GaK 804	810 \pm 100	Solomon River Phase (Lippincott 1978)
14 ML 371	GaK 1091	830 \pm 80	Solomon River Phase (Lippincott 1978)
25 FT 70	SI 50	880 \pm 70	
14 JW 301	GaK 593	910 \pm 100	
25 FT 13	SI 88	1010 \pm 60	
25 FT 16	SI 194	1020 \pm 80	
25 FT 13	SI 87	1020 \pm 60	
25 FT 35	WIS 324	1020 \pm 60	
25 BF 210	GaK 6222	1060 \pm 110	Loup River Phase (Ludwickson 1978)
25 FT 17	SI 36	1085 \pm 65	

Table 11. (continued)

Site	Sample No.	Date (A.D.)	Comments
14 ML 15	GaK 1089	1090 \pm 80	Solomon River Phase (Lippincott 1978)
25 FT 70	SI 53	1105 \pm 65	
25 FT 17	SI 32	1120 \pm 65	
25 FT 17	SI 73	1130 \pm 50	
5 FT 1	GXO 317	1140 \pm 125	
25 FT 36	SI 193	1150 \pm 100	
25 FT 145	GaK 6215	1150 \pm 100	Classic Upper Republican (Ludwickson 1978)
25 FT 145	GaK 6217	1150 \pm 100	Classic Upper Republican (Ludwickson 1978)
25 FT 70	SI 47	1160 \pm 65	
25 FT 35	WIS 318	1160 \pm 55	
25 FT 17	I 585	1170 \pm 125	
25 FT 35	WIS 319	1180 \pm 55	
14 FT 16	GaK 638	1190 \pm 90	Solomon River Phase (Lippincott 1978)
25 FT 36	SI 192	1200 \pm 80	
25 FT 39	SI 56	1200 \pm 65	
25 HN 36	I 642	1200 \pm 100	
25 FT 16	I 583	1235 \pm 125	
25 FT 17	SI 40	1240 \pm 65	
5 WL 101	GaK 1304	1240 \pm 90	
5 WL 27	GXO 566	1255 \pm 110	
25 FT 39	SI 196	1280 \pm 120	
5 FT 4	GXO 560	1290 \pm 250	
25 FT 54	SI 70	1310 \pm 50	

Table 11. (continued)

Site	Sample No.	Date (A.D.)	Comments
25 BF 210	GaK 6221	1330 \pm 100	Loup River Phase (Ludwickson 1978)
14 ML 306	GaK 803	1330 \pm 90	Solomon River Phase (Ludwickson 1978)
14 ML 306	GaK 803	1330 \pm 90	Solomon River Phase (Ludwickson 1978)
14 ML 5	GaK 639	1340 \pm 100	Solomon River Phase Rejected (Ludwickson 1978)
25 FT 32	M 1365	1385 \pm 100	
5 FT 6	GXO 564	1405 \pm 150	
25 FT 13	I 584	1440 \pm 100	
25 FT 70	M 844	1450 \pm 200	
25 FT 35	GaK 1676	1480 \pm 120	
25 FT 210	GaK 6223	1480 \pm 100	Loup River Phase (Ludwickson 1978)
14 FT 8	GaK 637	1495 \pm 90	Solomon River Phase (Lippincott 1978)
25 FT 80	SI 72	1510 \pm 40	
25 FT 210	GaK 6220	1530 \pm 100	Loup River Phase (Ludwickson 1978)
25 FT 35	GaK 1674	1630 \pm 90	
14 FT 5	GaK 640	1720 \pm 90	Solomon River Phase (Rejected Lippincott 1978)
25 FT 16	SI 195	Modern	

complexes, such as the Franktown focus, and then spread rapidly into the Upper Republican heartland. Wedel (1978) suggests that the Central Plains Tradition started in the 8th century and apparently accepts Hofman's (1978) ca. A.D. 800 beginning date for the Custer Phase.

There appears to be some basis for dividing Upper Republican into three phases, with the earliest, called the Solomon River phase, being farthest south and having a suggested beginning date at A.D. 800 to 850 (Lippincott 1978). If the three phase division is valid, the second, called Classic Upper Republican, would have overlapped considerably with the Solomon River phase, beginning between A.D. 900 and 1000. The earlier dates (and latest) for Upper Republican sites (Table 11) have been rejected by various authors, to be discussed later. With as many radiocarbon dates as are now available, we can be reasonably certain that the Upper Republican occupation of southern Nebraska was vital from about A.D. 1000 to sometime between 1350 and 1450. Sites assigned to late Upper Republican, the Loup River phase in east central Nebraska (Ludwickson 1978), may have still been occupied after A.D. 1450. It is an open question as to whether these sites were directly transitional between Classic Upper Republican and Lower Loup (protohistoric Pawnee). In any case, there were almost certainly shifts in the centers of gravity of the Upper Republican population, along with fusion and fission involving other Central Plains Tradition complexes, during the A.D. 950-1450 period.

Ludwickson (1975: 143) tabulated 36 radiocarbon dates (with MASCA corrections) for Upper Republican sites. The statistical nature of such dates indicates that the true age of 11 of the 36 samples could fall outside the reported dates \pm one standard deviation. Ludwickson (1975: 59-61) reasoned that the extreme dates are the most apt to be in error so he rejected the five earliest and the six latest. He also notes that "The number of dates rises rapidly between A.D. 1030 and 1110, levels off for 100 years, and falls less abruptly from A.D. 1220 to 1390. This pattern suggests that a reasonable estimate of the span of this phase would be from A.D. 1050 to 1350." Among the early dates rejected by Ludwickson are two from 25 FT 70, A.D. 720 ± 100 and 915 ± 85 , although other dates from this site are A.D. 1130 ± 90 , 1170 ± 75 , and 1425 ± 180 . Ludwickson notes that the two early samples:

... may have originated from a component reported to have a ceramic assemblage with up to 90 percent unthickened rims (Kivett 1961: 22). The true cultural affiliation may well be closer to the Solomon River Phase than the Classic Upper Republican Phase; and if this is true, only 34 of the 36 dates originate in the latter culture and two other dates, presumably early dates, should be chosen for statistical rejection.

This latter argument obviously hinges on the validity of dividing the Upper Republican aspect into three sequential phases: from early to late, the Solomon River phase, the Upper Republican phase and the Loup River phase. It should be noted that Kivett does not identify the site(s) in the Medicine Creek Reservoir where the high incidence of unthickened rims occur; 25 FT 70 was, however, one of the largest villages (nine house floors excavated) in the reservoir and did contain a small Woodland component (Wedel 1953a: 15; Kivett and Wedel 1948).

Another of the rejected dates is the A.D. 505 ± 85 date from site 25 FT 17 for which five other, accepted, dates are reported: A.D. 1110 ± 80 , 1180 ± 120 , 1140 ± 80 , 1150 ± 70 , and 1255 ± 55 . Uncovered at this site was the major part of one entire village: eight house floors, 25 storage pits and five middens (Kivett and Wedel 1948: 1) so the span of dates, with the highly aberrant early one rejected, looks quite reasonable.

The early date of A.D. 440-880 for site 25 FT 36 was also rejected by Wood (1969: 14), who excavated the single house at this site. Furthermore, Ludwickson (1975: 144) rejected two dates of A.D. 1425 ± 80 and 1535 ± 105 from this house as being too late; while Wood rejects only the most recent. This leaves three dates accepted by Ludwickson for this house: A.D. 1040 ± 60 , 1160 ± 70 , and 1175 ± 65 . Comparison of the dates given by these two authors is somewhat confusing, since Ludwickson uses the MASCA correction of Ralph, Michael, and Han (1973).

The fifth date rejected by Ludwickson as being too early is one of A.D. 1050 ± 90 from site 25 FT 16, which was located on the same terrace as, and about 70 m from, 25 FT 17 (Kivett 1949a: 278-281), so close that they could reasonably have been considered one site. One other date from this small (three house) site (Kivett and Wedel 1948: 2) is an acceptable A.D. 1230 ± 120 .

Also rejected by Ludwickson as being too recent is a date A.D. 1385 ± 60 for site 25 FT 13, a large site (eight excavated houses) a short distance upstream from sites 25 FT 16 and 17 (Kivett and Wedel 1948: 2). The two other dates from this site of A.D. $1030 \pm$ complexes, such as the Franktown focus, and then spread rapidly into the Upper Republican heartland. Wedel (1978) suggests that the Central Plains Tradition started in the 8th century and apparently accepts Hofman's (1978) ca. A.D. 800 beginning date for the Custer Phase.

There appears to be some basis for dividing Upper Republican into three phases, with the earliest, called the Solomon River phase, being farthest south and having a suggested beginning date at A.D. 800 to 850 (Lippincott 1978). If the three phase division is valid, the second, called Classic Upper Republican, would have overlapped considerably with the Solomon River phase, beginning between A.D. 900 and 1000. The earlier dates (and latest) for

Upper Republican sites (Table 11) have been rejected by various authors, to be discussed later. With as many radiocarbon dates as are now available, we can be reasonably certain that the Upper Republican occupation of southern Nebraska was vital from about A.D. 1000 to sometime between 1350 and 1450. Sites assigned to late Upper Republican, the Loup River phase in east central Nebraska (Ludwickson 1978), may have still been occupied after A.D. 1450. It is an open question as to whether these sites were directly transitional between Classic Upper Republican and Lower Loup (protohistoric Pawnee). In any case, there were almost certainly shifts in the centers of gravity of the Upper Republican population, along with fusion and fission involving other Central Plains Tradition complexes, during the A.D. 950-1450 period.

Ludwickson (1975: 143) tabulated 36 radiocarbon dates (with MASCA corrections) for Upper Republican sites. The statistical nature of such dates indicates that the true age of 11 of the 36 samples could fall outside the reported dates \pm one standard deviation. Ludwickson (1975: 59-61) reasoned that the extreme dates are the most apt to be in error so he rejected the five earliest and the six latest. He also notes that "The number of dates rises rapidly between A.D. 1030 and 1110, levels off for 100 years, and falls less abruptly from A.D. 1220 to 1390. This pattern suggests that a reasonable estimate of the span of this phase would be from A.D. 1050 to 1350." Among the early dates rejected by Ludwickson are two from 25 FT 70, A.D. 720 ± 100 and 915 ± 85 , although other dates from this site are A.D. 1130 ± 90 , 1170 ± 75 , and 1425 ± 180 . Ludwickson notes that the two early samples:

... may have originated from a component reported to have a ceramic assemblage with up to 90 percent unthickened rims (Kivett 1961: 22). The true cultural affiliation may well be closer to the Solomon River Phase than the Classic Upper Republican Phase; and if this is true, only 34 of the 36 dates originate in the latter culture and two other dates, presumably early dates, should be chosen for statistical rejection.

This latter argument obviously hinges on the validity of dividing the Upper Republican aspect into three sequential phases: from early to late, the Solomon River phase, the Upper Republican phase and the Loup River phase. It should be noted that Kivett does not identify the site(s) in the Medicine Creek Reservoir where the high incidence of unthickened rims occur; 25 FT 70 was, however, one of the largest villages (nine house floors excavated) in the reservoir and did contain a small Woodland component (Wedel 1953a: 15; Kivett and Wedel 1948).

Another of the rejected dates is the A.D. 505 ± 85 date from site 25 FT 17 for which five other, accepted, dates are reported: A.D. 1110 ± 80 , 1180 ± 120 , 1140 ± 80 , 1150 ± 70 , and 1255 ± 55 . Uncovered at

this site was the major part of one entire village: eight house floors, 25 storage pits and five middens (Kivett and Wedel 1948: 1) so the span of dates, with the highly aberrant early one rejected, looks quite reasonable.

The early date of A.D. 440-880 for site 25FT 36 was also rejected by Wood (1969: 14), who excavated the single house at this site. Furthermore, Ludwickson (1975: 144) rejected two dates of A.D. 1425 ± 80 and 1535 ± 105 from this house as being too late; while Wood rejects only the most recent. This leaves three dates accepted by Ludwickson for this house: A.D. 1040 ± 60 , 1160 ± 70 , and 1175 ± 65 . Comparison of the dates given by these two authors is somewhat confusing, since Ludwickson uses the MASCA correction of Ralph, Michael, and Han (1973).

The fifth date rejected by Ludwickson as being too early is one of A.D. 1050 ± 90 from site 25 FT 16, which was located on the same terrace as, and about 70 m from, 25 FT 17 (Kivett 1949a: 278-281), so close that they could reasonably have been considered one site. One other date from this small (three house) site (Kivett and Wedel 1948: 2) is an acceptable A.D. 1230 ± 120 .

Also rejected by Ludwickson as being too recent is a date A.D. 1385 ± 60 for site 25 FT 13, a large site (eight excavated houses) a short distance upstream from sites 25 FT 16 and 17 (Kivett and Wedel 1948: 2). The two other dates from this site of A.D. 1030 ± 60 and 1040 ± 60 are the two earliest dates *not* rejected by Ludwickson (1975: 143), and if he were to reject two more on the basis that two of the early dates might represent the Solomon River phase rather than the Upper Republican phase, he would be rejecting all radiocarbon dates for site 25 FT 13. It would be especially interesting to determine what ceramic complexes were associated with the samples that yielded these radiocarbon dates. The other dates rejected as being too late are single dates for sites: A.D. 1430 ± 20 for 25 FT 80, 1440 ± 60 for 14 ML 8, and 1340 ± 80 for 25 FT 13.

Lippincott (1978) presented 10 radiocarbon dates for Upper Republican sites in the Glen Elder Reservoir area. Of the ten dates, three were rejected, and on the basis of the others he provides corrected dates of A.D. 800-850 to 1200-1250 with the suggestion of a rapid decrease in population during the last 50 years. He also presents the results of two computer-assisted seriations of various sections of the 15 sites excavated. There is not good agreement between his two seriations and the radiocarbon dates. Furthermore, if one compares the sequence of all the units that Carlson (1971) included in his preferred seriation with all the units presented by Lippincott (1978) in his two seriations and radiocarbon sequence, the correspondence is very poor; in fact there would be a better match if Carlson's sequence were reversed. If, however, one compares the temporal orderings of the ten houses that both Lippin-

cott (1978: 91) and Carlson (1971: 92) use for interpretive graphs, the correspondence of the sequences is amazingly close for all but one site (14 ML 376). This strongly suggests that samples taken from specific houses are much more apt to represent a short time span than samples taken from other provenience units or features. It is not entirely clear, however, how Lippincott arrived at the overall ordering of the 16 houses, considering the inconsistencies in his three independent sequences.

Other radiocarbon dates of relevance include one of A.D. 910 ± 100 (presumably uncorrected) reported by Witty (1965: 9) from site 14 JW 301, "a small Upper Republican village located on Buffalo Creek, south of Mankato, Kansas. During the spring of 1964 the writer [Witty] excavated an earth lodge at this site." The charcoal dated came from a pit in the floor of House 1.

An unusual house at site 14 BT 420, Barton County, Kansas, assigned to the Smoky Hill aspect (Graves and Button 1964), had a prepared clay floor and lacked the usual center posts. A burned timber from the floor of this house yielded a date of A.D. 1480 ± 80 , presumably uncorrected (Witty 1965: 9). The date is much too late if Smoky Hill is ancestral to Upper Republican. The prepared floor might reflect contact with Antelope Creek where plastered floors are the rule (Krieger 1946: 43) and the date would be appropriate.

Tree ring dates for Upper Republican sites are very rare. At Ash Hollow Cave, near the southeast corner of the panhandle of Nebraska, the tree ring sequence from the level associated with Upper Republican material extends for 205 years from A.D. 1313 to 1517 (H. Weakly 1946; W. Weakly 1961: 20-21), with the occupation taking place from about A.D. 1340 to 1517. The Dooley site, 25 FR 3, along the Republican River just east of the study area, yielded two datable samples with a terminal date of A.D. 1333 (W. Weakly 1961: 21, citing H. Weakly personal communication). Other dates from other Central Plains tradition sites are: A.D. 1473 from the Lynch site, 25 BD 1, in extreme northeast Nebraska; A.D. 1441 for the Wolfe Creek component of the Crow Creek site, 39 BF 11, in Buffalo County, South Dakota; and A.D. 1468 for the lower component at the Black Partizan site, 39 LM 218, in Lyman County, South Dakota (W. Weakly 1961: 21-22).

Although the evidence for dating Upper Republican and closely related sites is very limited, especially for sites outside the classic area, there seems to be a trend for these sites to become more recent as one moves from south to north, but with nearly all the dates falling between A.D. 800 and 1500.

Carlson (1971) attempted to provide a chronological ordering of 14 Upper Republican sites (Solomon River phase) from the Glen Elder, Kansas, area on the basis of pottery seriation, using a method that allowed for only three categories. He initially concerned himself with four primary categories

based on rim form and decoration: undecorated collared, decorated collared, undecorated unthickened, and decorated unthickened. After considering the various combinations (taking three at a time) he found that he got the best results by disregarding the undecorated unthickened rims. He concluded that decoration became more common (and more elaborate) through time on both collared and unthickened rims, and that near the end of the sequence decorated unthickened rims had reached their peak and were losing popularity. In comparing Upper Republican sites from various localities, he found that the closer the localities, the greater the similarity. Thus it is not clear as to which is the most important variable: time, space, or other. There does seem to be some kind of break at about the South Platte-Platte River line, with sites north of this line contrasting with those south of it in terms of frequencies of pottery rim types. Unfortunately, as stated previously, the seriation method chosen by Carlson would allow for only three types. It might be informative, for broader comparisons, to also consider undecorated unthickened rims, which are probably most common as one moves toward the southwest across the area of the Plains Village pattern.

There is no doubt but that there was a very dry period immediately after the Upper Republican sites in southern Nebraska were abandoned, and Wedel (1941a: 25, 1959: 571) has argued convincingly that worsening (drier) climatic conditions substantially contributed to, if they did not cause, the abandonment of Upper Republican sites. Major droughts in the area have been identified and dated from the tree ring record at A.D. 1439-1454 and A.D. 1539-1564, with a lesser, intermediate dry period at A.D. 1459-1468 (H. Weakly 1946, 1962; W. Weakly 1961). Wedel points out that abandonment as a result of the drought in the 1500s would not have given these people time to leave southern and central Nebraska, change their culture significantly and return to the Loup Valley as Lower Loup people. Grange (1980: 117-130), after careful consideration of various lines of evidence, places the beginning of the Lower Loup sequence at between A.D. 1500 and 1550. A termination of Upper Republican by the 1439-1454 drought, or this combined with the 1459-1468 drought, favored by Wedel (1959: 571), would better fit with Grange's dates, and would also provide time for the Upper Republican people to leave central and southern Nebraska and return to central Nebraska as Lower Loup people. Even if Ludwickson (1978) is correct that there was a transition *in situ* from the Loup River phase of Upper Republican to the Lower Loup phase, the earlier terminal date for at least the Classic Upper Republican phase would better fit the situation, since there are marked differences between the two complexes in such things as surface treatment of pottery, dominant house shape, and dominant burial pattern. These differences promp-

ted Wedel (1978: 160) to question Ludwickson's proposed reconstruction. If, as Ludwickson (1975: 59-60; 1978: 102) suggests, the western components of the Upper Republican phase, at least, terminated before A.D. 1350, then none of the three documented droughts in the 1400s and 1500s would have contributed to its demise. If Upper Republican ended in this area a century earlier, it is conceivable that the depressions left by the collapse of earth lodges did not fill in until the time of the droughts indicated by tree rings, so that the thick mantles of aeolian deposit generated by these could still conform to the concavities. As Wedel points out, however, the Loup River phase is typologically still much closer to the er Republican phase than to Lower Loup-Pawnee.

Ludwickson (1978) suggests a time-span for the Upper Republican phase (Classic Upper Republican) of A.D. 800-1350, and for the Loup River phase of A.D. 1250-1450 with the possibility that some Classic Upper Republican sites lower down on the Republican River, *e.g.*, in Webster County, might have survived later than A.D. 1350.

Grange (1968) in his painstaking study of Lower Loup and Pawnee pottery, apparently made comparisons with all ceramic complexes with which similarities could be expected. It becomes clear from his archeological comparisons (1968: 121-127) that there are indeed far more similarities between Lower Loup pottery and wares to the north, as far north as central South Dakota, at least, than to pottery occurring in any other direction. In general, his conclusions support the idea advanced as early as 1940 by Strong (1940: 382-383), championed later by Spaulding (1956: 110) and followed by many archeologists since, that the Arzberger site in central South Dakota would be a good candidate for a site transition between Upper Republican and Lower Loup. If there was continuous occupation of the Loup River drainage by the Upper Republican-related, Loup River-phase people into historic times, as Ludwickson (1978) proposes, then there would have been a marked and sudden change in ceramics, as well as house pattern, at the time that these people abandoned the Loup River phase sites and moved a few kilometers east to establish the early Lower Loup phase sites. Ludwickson notes that Loup River phase pottery shows a great deal more variation in decoration than does Classic Upper Republican, a change in the direction of Lower Loup, although there is apparently no appearance of simple stamping, a hallmark of Lower Loup pottery, on any Upper Republican ware. Also, Grange feels that the few cord-roughened sherds found at Lower Loup sites are intrusive. Ludwickson reports a larger proportion of round houses and smaller houses from Loup River phase sites than from Classic Upper Republican sites. Presumably, all Lower Loup houses are round. Also, the Loup River phase site with the largest number of houses (22) is significantly larger than the Classic Upper Republican site

with the largest number of houses (10). Some Lower Loup sites have even more houses, *e.g.*, the Burkett site, with over 50. Although Wedel (1978) is reluctant to accept Ludwickson's hypothesis, I feel that it is too early to reject it out of hand, and concur with Ludwickson that it would be highly desirable to have detailed analyses and reports on the great number of excavated but unreported (in print) Central Plains tradition sites from along Medicine Creek and from the Loup River Drainage. Also, detailed comparison of Loup River phase pottery with that of complexes to the north and east would certainly be called for. A companion hypothesis that should be considered and tested is that Nebraska phase (culture) is ancestral to the Arikara, perhaps through an Arzberger phase transition. This relationship is suggested by the evidence from comparative human osteology according to Richard McWilliams (personal communication).

Thus, the typological, temporal and spatial distributions of Upper Republican sites can lead, and have led, to a variety of interpretations. Perhaps the most widely held is that the entire Upper Republican area was occupied more or less at the same time, and that with worsening climatic conditions in the 1400s, the Upper Republican people moved north to live along the Missouri River, where their culture changed before they returned to east-central Nebraska as Lower Loup people, that is, protohistoric Pawnee. A variation of this model would have the Upper Republican people abandoning at least the western part of their area more than once before withdrawing to the north to return as Lower Loup people. Another variation would have Upper Republican people abandoning sites farther southwest and moving into the Loup River drainage, staying there while they changed into protohistoric Pawnee. Yet another model, to be discussed later, would have the Upper Republican people moving into the panhandles of Oklahoma and Texas to become the Panhandle aspect people, and later returning to east-central Nebraska as protohistoric Pawnee.

I suggest a "fusion and fission" model combining various elements of the above. It would have various Plains village tradition local groups in the Central and Southern Plains evolving from indigenous Woodland local groups, along more or less parallel lines, but with local variations, while maintaining communication among themselves and with people to the east. As climatic conditions deteriorated in one limited area, there would be constriction of territory through dispersion and amalgamation; then as conditions improved in a particular area there would be expansion and reoccupation. During the A.D. 1000-1500 period there were numerous droughts of varying duration that could have triggered such changes in population centers. During the severe droughts of the 1400s, there was radical displacement of people, with the center of gravity of Upper Republican population shifting to the

north and east, with at least part of the Panhandle aspect people joining with Upper Republican groups to become protohistoric Pawnee in north-central and northeast Nebraska; at this time the Washita River aspect people also moved north to become the protohistoric Wichita.

Panhandle Aspect (Antelope Creek Focus)

The Panhandle aspect dominated the northern half of the Texas panhandle, the Oklahoma panhandle and west-central Oklahoma between A.D. 1200 to 1450, during the Middle Ceramic period. At one time two foci were defined with essentially those sites in the panhandles being assigned to the Antelope Creek focus and those in west-central Oklahoma to the Optima focus. Additional work led to dropping the Optima taxon and including its sites in the Antelope Creek focus. More recently Campbell (1976) assigned the Apishipa focus, found on the Chaquagua Plateau in southeastern Colorado, to the Panhandle aspect. Lintz (1978c) questioned this assignment and limited his discussion of the Panhandle aspect to those cultural manifestations included in the Antelope Creek focus. To save confusion and to beg the question of Apishipas taxonomic status, the term Panhandle aspect is here used essentially as a synonym for Antelope Creek focus. Although the Apishipa focus is probably related to the Antelope Creek focus, it appears to be peripheral to the development leading to the distinctive Antelope Creek culture and will be discussed separately.

The Panhandle aspect has attracted the attention of archeologists since the 1920s. Unfortunately, much of the work done on the Panhandle aspect has never been published; in fact, there is apparently no thorough published description of the results of a single major excavation. The selected and annotated bibliography of 150 items on the Antelope Creek focus by Lintz (1978d, revised 1980b) contains references, including a large number of unpublished manuscripts on 48 Antelope Creek focus sites out of an estimated several hundred sites. Hughes (1977b) also has prepared a useful chronological bibliography of Panhandle Archeology. In recent years there have been a number of articles reporting and interpreting radiocarbon dates, but the apparent discrepancies among the dates lead to quite different interpretations and create confusion. One still gets the impression, however, that Antelope Creek is a very extensive and intricate, with hundreds of sites, complex on which we have relatively little and very spotty basic information. This is not to fault the various early investigators, for their contributions are solid considering the state of the art and the resources available to them at the time. Because of extensive site destruction since the 1930s, much of the information they collected can probably not be

duplicated today. Also, there is no way that archeologists could get the same amount of information for the same number of dollars, actual or effective. The early work, along with continuing research, has served to identify problems on which attention should be focused. The same applies to many other archeological complexes, but the status of Antelope Creek focus archeology is especially relevant for this study since it appears to be the most obvious climax culture in the Southern High Plains.

The sites of the Antelope Creek focus have been of special interest to archeologists because of its stone structures, some of which contained many rooms (Eyerly 1907a, 1907b, 1910; Moorehead 1921, 1931; Mason 1929; Haynes 1932; Holden 1929, 1933). This architecture, which superficially resembles that of the Southwestern Pueblos, led to the assumption that the sites were related to the Pueblos; an interpretation strengthened by the presence of some Pueblo potsherds at Antelope Creek sites. One early writer, Moorehead (1921), even suggested that the Panhandle culture was ancestral to Pueblo culture, an idea entirely without merit. Architecture aside, the artifact inventory closely resembles that of contemporaneous late prehistoric farmers and hunters who lived farther north.

A number of Antelope Creek sites are mentioned frequently in the literature and provide much of the basic information available on this complex. Apparently the first sites to be reported in the literature by an archeologist resulted from Moorehead's (1921) survey, which proceeded westward from Oklahoma. Thus, the first sites with stone ruins that he encountered were on Wolf Creek, in central Ochiltree County, Texas, whereas most Antelope Creek focus sites are located in the valley of the Canadian River. Along the Canadian, in the north-central Texas Panhandle, Moorehead reported other ruins on the Archie King Ranch, and on Cottonwood, Tarbox, Antelope and Dixon Creeks.

Tarbox Creek Ruin B was investigated by Holden (1929), who reported that it measured 21 by 11 m and consisted of 12 to 15 rooms of various shapes. He also noted that one wall was 41 cm thick and consisted of vertical-slab masonry plus horizontal coursing. Moorehead (1931: 106-113) presents additional observations on the Tarbox Ruin and quotes extensively from Holden.

The Alibates Ruin was visited by Mason (1929); he was taken there by Floyd Studer of Amarillo who had located many of the Antelope Creek ruins. This ruin, on a hill overlooking the Canadian nearly straight north of Amarillo, was characterized as having dozens of rings and a few rectangles made of stone laid flat or placed on edge. Several of the rooms were excavated and in some it was noted that the structure had been rebuilt several times, with one clay floor above another to a depth of 1 m. The rooms originally were semisubterranean.

The Antelope Creek Ruin, sometimes called "A-

C," was investigated in 1930 for Texas Tech by Holden (1931). This multiroom structure was 50 by 16 m with walls constructed in the style found at many Antelope Creek focus sites; stone slabs are set on edge in parallel rows about 1 m apart and the space between filled with earth. The walls, built of four or five successive courses, were about 1.5 m high, and tapered from about 1 m thick at their bases to about 30 cm at the top. Many of the corners were square and the structure had been quite regularly laid out. Evidence of an older occupation was found under this large multiroom structure. Additional work was done at the site under the WPA (Baker and Baker 1939, 1941a,b) and it was mentioned by C.S. Johnson (1939), Lowery (1932), and Moorehead (1921, 1931).

Saddle-Back Ruin continues to be referred to although there is no extensive report of work done there. Holden (1931, 1933) and Haynes (1932) described excavations at the site, which included a 33-room structure. Studer (1931b) provides the information that this site showed evidence of long occupation, with four superimposed floors in one room. Apparently also from this site came Southwestern sherds identified as Glaze I and Biscuit A.

Coetas Ruin (Ruin 55) was described by Studer (1934) in an article in which he proposed the name of "Texas Panhandle Culture Ruins." In this article he also described the great variety of architecture at sites assignable to this proposed complex.

The Handley Ruins (which include the Gould Ruin) are along Wolf Creek, in the northeastern corner of the Texas Panhandle, and hence away from the main concentration of Antelope Creek sites along the Canadian River. They were investigated by Moorehead (1931) and received further attention from Ellzey (1966). The Gould Ruin consisted of a large rectangular structure within which secondary burials were found.

A detailed summary of the results of investigations at various of the Antelope Creek focus sites is to be found in Krieger (1946). More recently Lintz (1978e) has presented an excellent synthesis including new data, primarily radiocarbon dates. The following summary of Antelope Creek focus archaeology has drawn heavily on Lintz's descriptions.

Most of the excavated Antelope Creek focus sites are in the Stanford Reservoir area, on the Canadian River in the north-central Texas Panhandle, a very limited sample geographically that may be giving us a somewhat distorted picture. Sites are frequently on first or second terraces above broad flood plains. Some are on steep-sided mesas, suggesting concern for defensibility. Many of the sites are on small tributaries or near upland playas, but these have received little attention. In addition there are many even smaller outlying sites, probably hunting camps. Occasional sherds of Borger Cord-marked pottery, the type associated with the Antelope Creek focus, have been found here and there all over the plains of

northeastern New Mexico and into the Pueblo area as far west as Santa Fe.

Antelope Creek focus sites have been dated by both radiocarbon and Southwestern trade sherds (Lintz 1978e: 42-43). Radiocarbon dates, corrected according to Damon et al. (1974), range from A.D. 1150 ± 70 to 1590 ± 150 . In analyzing the dates Bryson, Baerreis and Wendlund (1970: 69) state that with considerable statistical certainty one can say that the people were not there (in the Panhandle) between A.D. 1180 and 1200, and were there by A.D. 1220. Baerreis and Bryson (1966) state that the dates for the Antelope Creek focus cluster between 1200 and 1450, dates that are generally accepted. The 10 Southwestern trade sherd types all fall within this 250-year period and essentially span it (Lintz 1978e: 43).

The Antelope Creek focus shares various artifact types with farming-hunting complexes of the Central Plains tradition: diamond-shaped alternate-bevel chipped stone knives (which after many resharpenings look like drills), commonly 13 cm long and 5 cm wide; various other types of stone knives; small side-notched, delicately chipped projectile points, 2.5 cm or so long; expanded-base drills; well-made end scrapers; sandstone arrow shaft smoothers; stone elbow pipes; bison scapula hoes or digging tools; bone shaft wrenches; bone awls and bone beads. The pottery at Antelope Creek focus sites is predominantly Borger Cord-marked. Lintz (1978e: 45) describes the ceramic complex as follows: "Ceramic items include perforated sherd discs, straight "cloud blower" pipes (rare), and a pottery type characterized almost exclusively by globular-shaped, cordmarked or smoothed-over cordmarked vessels." In addition, the Antelope Creek inventory includes bison tibia digging stick tips, manos and metates and notched bone rasps. Artifacts not found in the Antelope Creek inventory but present in Upper Republican (with which Antelope Creek is commonly compared) include bone beamers, bone gorgets, antler bow guards or bracelets, bone fishhooks and pottery elbow pipes. Most of these artifacts are not especially common in Upper Republican, and perhaps their absence in Antelope Creek represents a sampling error. The absence of manos and metates in Upper Republican could reflect, in part, the scarcity of suitable raw material.

The most distinctive feature of Antelope Creek focus sites is the architecture. Although highly variable, it is characterized by the utilization of stone slabs in the walls. Site size ranges from single isolated rooms to villages of up to 35 room-units. Large sites may be comprised of numerous single free-standing rooms and/or multiroom structures. In either case, rooms may be round or square, although as might be expected, multiroom structures with round rooms appear to be rare. Sites consisting entirely of isolated units are most common, and at them structures are divided about equally between

round and square rooms. Room sizes range from 9 to 130 square meters. The large square rooms frequently have a long low entrance or ventilator to the east, an east-west channel about a third of the width of the house in the floor, four or six major support posts at the edges of the channel and, at the west end of the channel, a massive clay altar either extending into the room or set in a niche in the wall. Sometimes small rooms flank the entrance. Walls, or wall bases, frequently consist of a single or double row of stone slabs set on edge in adobe, with higher rows set within lower rows so as to produce a progressively thinner wall. Occasionally, walls are rubble-filled, and some walls are of adobe with post reinforcements. Lintz was unable to establish any temporal or geographical boundaries for the variation in Antelope Creek focus architecture, except that in a few cases structures which incorporated stone in the walls were stratigraphically above structures without stone in the walls. The early dichotomy of foci (Antelope Creek focus and Optima focus) was based on apparent differences in architectural style between the sites in the central Panhandle of Texas and those in west-central Oklahoma. Lintz has demonstrated that this distinction is not valid, but the possibility that architectural variation represents differences in function between rooms and between sites needs to be further explored.

The many small sites that probably represent hunting camps or travel way stations are found not only well away from the major sites, but even far beyond the core area of the Panhandle aspect. Study of these small sites, often far from water sources, could well provide a better understanding of both the dynamics and history of the aspect.

The presence of Panhandle aspect sites in the vicinity of Las Vegas, New Mexico, was first reported by Holden (1931: 44) apparently on the basis of hearsay evidence and, I am certain, wishful thinking. He states, "A number of slab-stone ruins of the single room Panhandle type were found, some within ten miles [16 km] of Las Vegas. Mr. William Elfield[sic] of that place was instrumental in locating these. Time did not permit of the excavation of any of this type of ruin in the Las Vegas vicinity." There seems to be no evidence that Holden ever visited the sites and reports of later field work in the area have failed to confirm the presence of Panhandle sites there. On the basis of Holden's report Wendorf (1960), and Wedel (1961a: 149) citing Wendorf, have perpetuated the idea that the Panhandle aspect extended into the Las Vegas area. Incidentally, Wendorf incorrectly cites Holden (1930) instead of (1931) as the source. Occasional cord-roughened sherds have been found as far west as just south of Santa Fe where they were excavated from a large Pueblo site (S. Peckham, personal communication). Holden (1931) excavated at Tecolote Pueblo 16 km south-southwest of Las Vegas in hopes of finding a Pueblo ancestor for the Panhandle aspect but concluded

"The present indications however do not establish any relationship between the slab-house culture of the Panhandle and the Pueblo Culture of New Mexico." (Holden 1931: 52-53).

Apishapa Focus

The Apishapa focus (A.D. 1000 to 1400), a localized manifestation of the Plains Village pattern, appears to have developed in situ in the broken canyon-land of the Chaquagua Plateau. Of the nearly 1200 sites that Campbell (1976) recorded within some 5000 sq. km. on the Chaquagua Plateau, he attributes 68 to the Apishapa horizon. Prior to Campbell's work in the 1960s this complex was known but had received little attention. The presence of cord-roughened pottery associated with stone structures had suggested a relationship between Chaquagua Plateau sites, the Upper Republican aspect, and/or the Panhandle aspect. Campbell (1976: 96-97) has suggested that the Apishapa focus is ancestral to the Antelope Creek focus with some traits in the latter, however, coming from the Custer-Washita area. Lintz (1978: 36) convincingly refutes this possibility and even questions assigning the Apishapa focus to the Panhandle aspect; he does acknowledge a relationship between them.

Apishapa focus sites are usually located close to both water and canyon bottomland. Many are on isolated mesas or on walled-off, steep-sided points. A concern for defensibility seems obvious. Houses were either within or within sight of a defensible area. In one situation, a series of "forts" were so located that signals could be relayed from one to another for 11 km along a canyon. At those sites that had structures, the number of rooms ranged from one to 37. For the most part architectural units consisted of only a single room, usually circular. Some were oval or semi-circular; square rooms were very rare. Some sites had rows of contiguous rooms and one site had random clusters. Nineteen of the sites were rock shelters, and of these seven contained barrier walls. Walls and masonry structures were built almost entirely with vertical slabs. Structures were built on the surface of the ground and frequently there was so little fill over bedrock that excavation would have been impossible.

Apishapa focus artifacts generally resemble those of the Woodland complex that preceded it in the area. The bow and arrow was important, but darts, represented by both points and atlatl weights, were still present. Side-notched points were the dominant type and cane arrow foreshafts have been found. Bifacial and unifacial knives and cutting tools are common but distinctive alternate-bevel diamond-shaped knives are absent. Snub-nosed end scrapers are common but small side scrapers, flake scrapers, core scrapers and scraper knives are also found. Other stone tools include gravers, unifacial choppers, bifacial hand axes and several types of drills.

Manos, metates, and arrowshaft smooters were used. Bone artifacts included awls. Scapula hoes were not found even though maize was cultivated, apparently with digging sticks. Pottery, which was not abundant, is identified as Borger Cordmarked with a few sherds more deeply cord marked. Artifacts of vegetal material include twined basketry, probably coiled basketry, woven matting, yucca-fiber cordage and twined rabbit-fur cordage.

Campbell reports that beans and five varieties of maize were cultivated but that gathering wild plants and hunting small as well as large mammals continued to be important.

Emphasis on defense and large villages suggests that warfare was common. Campbell mentions the possibility of internecine conflict resulting from competition for farmland due to a great population explosion, and perhaps also to deteriorating climatic conditions. He also suggests the possibility of conflict with Pueblo people to the west or with Athapaskan invaders from the north, but it would be difficult to make a strong case for either. Evidence of trade can be seen in the occurrence of Alibates dolomite from the Panhandle of Texas and Medicine Creek jasper from southern Nebraska, obsidian (presumably from New Mexico), corrugated sherds from perhaps as close as Trinidad, Colorado, and Olivella shells presumably from the Pacific Ocean.

Burials were flexed, individual (rarely in pairs) and located in open areas, in rock shelters, or under house floors.

Campbell (1976: 62-63) sees no evidence of the Apishapa focus on the Chaquagua Plateau after A.D. 1400, and notes a decrease in the occupation during the 1300s. During this terminal century, he notes a replacement of cord-roughened pottery resembling Borger Cordmarked with a smudged ware that most closely resembles the Upper Republican ware found in the Colorado Piedmont. The dominant projectile points were triangular and side-notched. He postulates that surviving Apishapa people finally moved outright to the east, but that a few may have returned occasionally to hunt. Two rock shelters and an open site suggest such sporadic use.

An Apishapa focus/Panhandle aspect affiliation for a site about 7 km south of Las Vegas, New Mexico, has been suggested by Wiseman (1972, 1975). This site, Sitio Creston (LA4939), is characterized by 12 rock enclosures roughly circular and 2 to 4 m in diameter on the inside, clustered on top of a narrow ridge or creston. The walls consist of irregular rock available locally, either roughly piled or dry-laid on surfaces which had been somewhat leveled or cleared of sand. The similarity of the structures to ones reported from the Chaquagua Plateau (Campbell 1969) provides the main basis for suggesting their relationship to the Apishapa focus. The pottery from Sitio Creston, however, more closely resem-

bles Taos Gray, with only one sherd out of 612 cord-roughened, whereas Apishapa focus pottery is predominantly cord-roughened. The projectile points from Sitio Creston are of a type called Scallorn, predominantly corner-notched. Only one point was assigned by Wiseman to the Washita type, the preponderant type in the Apishapa focus, and of the points illustrated from Sitio Creston, none conforms to the Washita type. Furthermore, the end scrapers so common at Apishapa sites are missing at Sitio Creston. A comparison of this material from near Las Vegas with that from Escritores and Ponil sites about 160 km to the northeast (Glassow 1980: 73-74) will probably show greater similarity to the latter than to the Apishapa focus or Panhandle aspect.

Custer Phase

The cultural position of the Custer phase, especially its relationship to the Washita River phase, has been subjected to much discussion. The various positions have been (1) that they had separate origins and that similarities represented borrowing; (2) that they were contemporaneous, should be considered as belonging to a single focus, and that differences reflected only geographical separation; and (3) that Washita River evolved out of Custer which, in turn, evolved out of local Woodland complexes. Hofman (1975, 1978b) has carefully reviewed the history of these various interpretations and has argued convincingly for the third interpretation. Previously, Bell (1973) had proposed the Custer-Washita River continuum and Richards (1971) the Woodland origin of Custer. The advent of radiocarbon dating provided the main impetus for the continuum interpretation. The Washita River phase is, in turn, a very likely ancestor of the Great Bend aspect which is generally accepted as protohistoric Wichita.

Custer phase sites, for the most part, are concentrated in or near Custer County, Oklahoma, which is located in the middle of the state north and south and about 80 km east of the western border of the non-panhandle portion of the state. Other Custer phase sites are located near the center of Oklahoma and in the North Canadian drainage; some may even occur in southern Kansas (Hofman 1978b: 15, 18). Most, however, are in the drainage of the Washita River.

Bell (1973: 185) and Hofman (1975: 47; 1978b: 17-18) report the following four uncorrected radiocarbon dates for Custer phase sites:

Site	Date (A.D.)	Sample No.
Edwards II (Bk 44)	810 ± 70	Tx 807
Edwards II (Bk 44)	850 ± 80	Wis 123
Mouse (Cu 25)	950 ± 100	M 1091
Edwards II	970 ± 70	Tx 808

The Mouse site is in Custer County, Oklahoma and the Edwards II site is in Beckman County, about 50 km southwest of the main concentration of Custer phase sites. These dates, from A.D. 810 to 970, fit nicely with the accepted dates from the Washita River phase which range from A.D. 1000 to 1375, all with \pm figures, of course.

Among the sites assigned to the Custer phase, which can be viewed as transitional between a Plains Woodland lifeway and that of a fully developed Plains village complex, there are differences attributable to the cultural changes that were taking place. A comparison of artifacts that could be considered horticultural implements supports the idea that the Custer phase was becoming more dependent on horticulture. Woodland sites in the area produced few such artifacts and those found consisted of perforated shell hoes. Of the seven Custer phase sites considered by Hofman (1978b: 14) four produced scapula hoes and/or bone digging stick tips (a total of five each) and none yielded bison horn core hoes. On the other hand, the 13 Washita River phase sites he considered averaged 23 bison scapula hoes (0 to 117 per site), 12.8 bone digging stick tips (0 to 66 per site), and 3.5 bison horn core hoes (0 to 12 per site) with only two of the 13 sites yielding none of any type. Other bone and shell artifacts, neither common nor diagnostic, from Custer phase sites include: shaft wrenches, bone awls, scored ribs, shell disk beads, Olivella beads, and bone beads. The absence at Custer phase sites of deer mandible sickles and bone beamers is interesting and significant since both are rather common at many Washita River phase sites.

Custer Phase pottery (Hofman 1978b) is basically globular, without shoulders and with direct vertical to slightly flaring rims. The percentage of cordmarked pottery at Custer phase sites ranges from 25% to 100% and averages 66% of the total. Plains Woodland pottery is virtually all cord roughened, whereas most Custer phase sites have some smooth pottery. In contrast, only 3% of Washita River Phase pottery is cord marked and no site has as much as 15%. Decorated sherds from Custer Phase sites are very rare; handles are also rare and are restricted to smooth vessels. Flat bases are reported only for smooth vessels and pointed bases only for cordmarked vessels. The presence of calcite tempering was at one time thought to be useful in distinguishing between Washita River and Custer pottery, but it now appears to reflect availability of material.

Also of use in distinguishing Custer phase from Washita River phase sites are projectile points (Hofman 1978b: 18-19). Custer phase sites have an average of 28% corner-notched or stemmed, 35% side-notched and 37% triangular unnotched points whereas Washita River phase sites average only 7% corner-notched or stemmed, 41% side-notched and 52% triangular unnotched.

Detailed descriptions and/or tabulations of other artifacts from Custer phase sites are provided by Brighton (1951), Eighmy (1970), Gallaher (1951) and Hofman (1978b). Both snub-nosed end scrapers and side scrapers are common. Chipped knives are of various shapes including the alternately-beveled, diamond-shaped type. Chipped drills also occur. Ground stone artifacts include Plains-style sandstone arrow shaft smoothers and simple milling or grinding stones. Stone elbow pipes are rare and celts are absent.

Custer phase structures are poorly known. Bell and Baerreis (1951: 81) describe them as being square to rectangular, with four central support posts and a central fireplace. The abundance of burned clay suggested some sort of wattle and daub walls and/or roof. Cache pits, irregularly placed within the structures and scattered about the villages, are round to oval and 1 to 1.5 m deep. They were presumably intended for storage; however many were later filled with refuse. The few burials that have been found were flexed in round to oval pits. Hofman (1978b: 18) states that Custer phase villages "may have been composed of a small number of structures scattered along a section of river terrace" and that "Small hamlets and single house sites are apparently represented."

Washita River Phase

The Washita River focus was described in considerable detail in a functional or social-anthropological way by R. Bell (1973). Hofman (1975) compared the Washita River and Custer foci and later (1978b) defined and compared the Washita River and Custer phases. In the latter paper, he assigned four sites previously considered as Custer focus to the Washita River phase. His reason for doing so is sound and enables us to deal with the two complexes in a much more meaningful way. Since, except for geographical distribution, the addition of these four sites to the Washita River phase does not invalidate Bell's summary for that complex, one can view his summary as pertaining to the Washita River phase. Both Bell and Hofman had access to radiocarbon dates, none of which came from the reassigned sites. The reassignment affects the Custer phase in that it demonstrates more sharply the differences between it and Washita River.

As indicated above, the Washita River phase was very probably a direct outgrowth of the Custer phase with the Washita River people becoming more heavily committed to horticulture and participating fully in the Plains Village tradition. As would be expected, there is evidence of trade and cultural influence from Caddoan neighbors to the east.

The geographical distribution of the Washita River phase has not been fully determined, but is known to center along the Washita River in the wes-

tern half of Oklahoma with a few sites on the Canadian River (Bell 1973: 172; Hofman 1978b: 7). The area of the Washita River phase essentially includes that of the Custer phase, but, in addition, extends much farther east and perhaps north. Witty (1969) has suggested a Washita River assignment for one site in extreme south-central Kansas. Its location would not be surprising if at least some of the Great Bend (protohistoric Wichita) aspect stemmed from the Washita River phase. Much more work needs to be done in northern Oklahoma and southern Kansas on this problem.

The following six radiocarbon dates, all uncorrected, are from Washita River phase sites:

Site	Date (A.D.)	Sample No.	Comments
McLemore (Wa 5)	1000 ± 150	C 1245	
Lacy (Gv 5)	1150 ± 70	M 820	
Brown (Gd 1)	1250 ± 70	Wis 123	
McLemore (Wa 5)	1320 ± 55	R 829/2	
McLemore (Wa 5)	1375 ± 50	R 829/2	
Lee (Gv 3)	1425 ± 50	Tx 524	On corn, probably too recent

Hofman (1975: 47; 1978b: 17) considers all but the most recent one (A.D. 1425) reasonable, and it is suspect because it is based on corn. The earliest date (A.D. 1000) may be too early, since it is more than 300 years earlier than the other two dates from the McLemore site. However this, the earliest Washita River phase date (disregarding the standard deviations), is still slightly more recent than the most recent date of A.D. 970 for a Custer phase site, and is the only Washita River phase date for which the standard deviation overlaps with that of a Custer phase date. The number of dates for both phases is, of course, quite small. A reasonable estimate for the span of the Washita River phase would be A.D. 1000-1400.

As stated in the section on the Custer phase, the Washita River phase is distinguished from it primarily by differences in numbers or percentages of certain artifacts or attributes. Ceramic traits that are much more common at Washita River sites include: smooth surface finish (97%), flat bottoms, shoulders, handles, rim tabs and decoration, including appliques. Horticultural tools that are absent from or rare at Custer phase sites but common in the Washita River phase include: bison scapula hoes, bison tibia digging stick tips, bison frontal bone (horn core) hoes and milling stones or metates. Also, corn has been recovered from Washita River phase sites. Tools probably used in construction and found only at Washita River sites are celts (for cutting posts?) and deer mandible sickles (for cutting thatch?). Hunting and the processing of hides may have increased in the Washita River period, since bone beamers, absent at Custer sites, are common. Also, the average number of several other hunting and hide working tools increased from Custer to

Washita times: scrapers from 43 to 125, bone awls from 2 to 19, shaft wrenches from .6 to 3.2 and arrow points from 24 to 78. A change in types of arrow points probably reflects the time dimension more than a functional dimension. The percentage of unnotched and side-notched triangular points increased from 39% to 56% and 32% to 36% respectively, while corner-notched or stemmed points decreased from 29% to 8%. The change in average number of artifacts per site could also reflect larger populations and/or longer occupation as well as increased hunting and hide working activity.

Washita River houses were substantial structures but few have been excavated (Bell 1973: 176; Hofman 1978b: 8-9). They were apparently rectangular or square, 6 to 9 m across, with a central hearth. The roof was supported by large center posts and the walls consisted of smaller posts set vertically .5 to 1 m apart. The spaces between were filled with smaller poles or canes and plastered with clay. The roofs were probably made of grass thatch placed over poles since burned grass has been found. Miscellaneous post holes and storage pits are found inside the structures. Apparently the entrance was not a simple aperture. Houses were grouped in twos or threes up to perhaps a dozen, in small villages or hamlets dispersed along streams, primarily the Washita River. Villages are sometimes several kilometers apart. Burials are found in the villages and are usually flexed, although a few are extended. The head is commonly oriented to the east. Grave goods are sometimes associated with the burials and a few individuals appear to have died violently.

Pratt Complex

The Pratt focus is of special interest since it appears to be transitional between middle ceramic village complexes centering in western Oklahoma and the late ceramic Great Bend aspect (protohistoric Wichita). The Pratt focus is best known from two sites in Kansas, but is represented at other sites as well. The Pratt site (14 PT 1) (Wedel 1959) is on the north bank of the Ninnescah River, just west of Pratt in south-central Kansas, and the Larned site (14 PA 307) (Monger 1970) is at the confluence of Pawnee Creek and the Arkansas River in the edge of Larned, central Kansas. The Larned site, the westernmost Pratt focus site known, is just barely within the area here defined as the Central High Plains, but is especially significant in that the Pratt component is clearly separated stratigraphically from both the earlier Smoky Hill component and the later Great Bend component. Also, the Larned site provides our only information on Pratt complex structures. Witty (1978: 63) mentions a probable Pratt complex site on Walnut Creek in Rush County, Kansas, perhaps the northwesternmost site of the complex.

Within the 12 by 12 m excavation at the Larned site (Monger 1970), the remains of six Pratt focus houses were found separated vertically from one another by layers of silt 2.5 to 7.5 cm thick, indicating that the site was occupied for more than a short time. Perhaps annual floods each left one silt layer, but flooding was probably much less frequent. The same pattern of rebuilding after floods is found in the higher Great Bend aspect zone where more than 30 complete or partial structures were represented in the same 12 by 12 m excavation. The Pratt and Great Bend houses were very much alike. The Pratt houses all had four center posts, each located about 1.5 m from the center of the house. The perimeter of one house which had burned was outlined by 51 posts forming almost a circle, perhaps better described as a square with rounded, braced corners and convex sides. In the center was a fire basin; four "cache basins" were found within the house perimeter. The basins contained artifacts, ash, and charcoal. Fire basins and burned areas were also found outside the houses. There was no suggestion that the houses were built over pits, or that they had had covered entrances. Some historic Wichita houses had center posts; others did not. The protohistoric Great-Bend Wichita houses at Larned had none. If the Pratt focus is proved to be ancestral to at least some manifestations of Great-Bend Wichita, the evidence from the Larned site will suggest that the trend was away from using center posts.

Information from the Pratt site is based primarily on collections and observations made by local informants and relayed to Wedel (1959: 503-512). There are suggestions that the site may have been occupied successively by groups with different artifact assemblages although one component, called the Pratt complex by Wedel, seems to be the major one. Dismal River potsherds (Ware D) could represent an Apache component (village or temporary camp) or trade with Dismal River people. The most abundant pottery (Ware A) is cord-roughened, moderately hard, and tempered with rounded sand. Medium-sized jars are suggested, with decoration restricted to incisions on rounded lips. Monger (1970: 9) found similar pottery in the Pratt Focus component at the Larned site and provided a more detailed description. Wedel's ware B from the Pratt site is like Ware A but lacks the cord roughening. Ware C is plain with a homogeneous, compact paste tempered with an abundance of fine sand; these sherds reminded Wedel of ones from Paint Creek, a Great Bend site in central Kansas. Ware E, represented by one sherd, about a third of the rim of a small vessel, is smooth, with a fine compact paste thickly tempered with flakes of shell. The lip has diagonal incisions and four pinched pellets are applied on the neck. This ware is comparable to Geneseo and Cowley (Great Bend) wares. Southwestern trade sherds include one Bandelier Black-on-gray, dated at ca. A.D. 1424-1550, and three Glaze C, dated at

ca. 1450-1475. These dates are especially interesting in that they fall immediately after the suggested terminal date for the Washita River phase and just before the apparent beginning of the Great Bend aspect. Also, the pottery from the Pratt complex shows similarities to that of both Washita River and Great Bend. Wedel had previously suggested that the earlier of two components at the Pratt site had its ties to the south and a strong case can be made for a developmental sequence from the Custer phase through the Washita River and Pratt phases into the Great Bend aspect, which is generally accepted as protohistoric Wichita.

Chipped stone tools from the Pratt Site include projectile points, scrapers, drills and knives made from a variety of materials including, among others, obsidian (probably from New Mexico) and Alibates dolomite from just north of Amarillo, Texas. The points are small, bifacially chipped, and basically triangular with straight to concave bases and straight to convex edges. They are either unnotched or side-notched, with one of the latter having a basal notch as well. Scrapers are plano-convex. One pipe drill, with one pointed and one rounded end, and two expanded-base drills with unworked bases are described. Also included are two diamond-shaped, alternate-bevel knives and four knives with two beveled blades and variously shaped butts. Ground stone artifacts include shaft smoothers of Dakota sandstone and of limestone, a fragment of a (tubular?) pipe made from a fine-grained red stone, milling slabs, mullers, grooved mauls and five small pieces of worked turquoise.

Digging stick tips or points made from the distal portion of bison tibiae are common at the Pratt site. In the process of manufacture, the shaft had been cut diagonally so as to produce a beveled, chisel-like point that was ground down and smoothed but never serrated. From the distal articular surface a hole 20 to 25 mm in diameter was drilled into the cavity of the bone to provide a socket for hafting. Wedel knows of no other tools of this type from Kansas, although the method of hafting is similar to that for bison scapula hoes found in some Great Bend sites. Such bison-tibia digging-stick heads have been reported from Late Prehistoric and Protohistoric sites in Oklahoma and Texas, however, and two specimens are known from South Dakota. In general, the basic Plains agricultural tools used south of Kansas would appear to be bison scapula hoes, bison frontal hoes and bone tipped digging sticks, while the bison scapula hoe prevails in and north of Kansas.

According to Monger (1970), the chipped stone artifacts from the Pratt component at the Larned site resemble closely those found in the Great Bend component, but are better finished. The projectile points are small, triangular with straight or concave bases, and either unnotched or side-notched, with an occasional basal notch. Knives are oppositely

beveled with two or four edges; a few of the two-edged knives are stemmed. Both end scrapers and side scrapers (with either one or two scraping edges) are common. Drills, which have expanding bases, are either carefully worked or on unmodified flakes. Ground stone artifacts from the Pratt complex include sandstone shaft smoothers, a grooved maul, and a small turquoise bead. Bone artifacts include awls made from split long bones, ribs, or neural spines; transversely scored rib rasps, rib fragments with rounded ends, and rasps made from deer mandibles. Fragments of two clay pipes and pieces of worked shell were also found. Monger notes that none of the horticultural tools found at the Pratt site are represented in the Pratt component of the Larned site. This led him to interpret the latter as a hunting camp rather than as a permanent horticultural village, although he does note that the structures were reasonably substantial.

Elsewhere in the present volume, in the section on the Smoky Hill component at the Larned site, there is a discussion of what appears to be evidence of two drought periods (possibly corresponding to two droughts of the 1400s known elsewhere in the Plains) between the Smoky Hill zone and the Pratt focus zone. This evidence is in marked contrast with that for abundant moisture suggested by the Pratt and Great Bend zones showing repeated flooding of the site.

Sopris Phase

In the foothills of extreme southern Colorado near Trinidad, the Sopris phase, the only phase of the Upper Purgatoire complex, dates at A.D. 1000-1225 and appears to represent an indigenous population strongly influenced by Pueblo culture and trade from the Upper Rio Grande. Although these sites seem to be related to ones near Taos, a relationship to sites in the Piedra district of southwestern Colorado (Roberts 1930) might also be worth considering. There are also indications of a lesser influence from, or at least modest trade with, the Plains. Thus far, a transition to Sopris from the earlier Archaic, "Basketmaker," or Woodland complexes has not been demonstrated. Although Sopris sites contain substantial architecture and locally made pottery, C. Wood and Bair (1980: 227) see them as manifestations of a basically hunting and gathering subsistence economy, with only incipient horticulture. Sparse as direct evidence of Sopris horticulture is, however, I strongly suspect that there was essentially a balance between gardening and hunting/gathering.

Baker's (1964) earlier suggestion that the Upper Purgatoire complex contained another, earlier, phase, which he called the St. Thomas, has now been abandoned. However, the Sopris phase has been divided into three temporal subphases by C. Wood and Bair (1980: 227): Initial, Early and Late.

The Initial phase, A.D. 1000-1100, "is characterized by the construction of semisubterranean pit houses, Jacal structures, and campsites which may or may not have been associated with a Jacal or brush superstructure." The ceramics are thought to consist of both Taos Gray and a locally made variety, Sopris Plain, which are virtually indistinguishable from one another. With regard to other artifacts, basin metates predominate over slab and trough metates, corner-notched points are slightly more abundant than side-notched and stemmed ones, and elbow pipes, which continue throughout the phase, are present. Dating is based on three archeomagnetic dates as well as dates attributed to Taos Gray at Pot Creek, near Taos, New Mexico.

The Early Sopris phase, A.D. 1100-1150, "is characterized by the construction of adobe houses. Jacal construction incorporated with the basic adobe structure appears to be transitional between Initial and Early phases" (Wood and Bair 1980: 229). According to Lang (1977: 6), adobe and jacal surface structures appear during late Pueblo II times on the Northern Rio Grande. At the earliest Sopris site with adobe construction, one structure has adobe footings to help hold posts for a jacal superstructure, apparently a transitional form. Ceramics continue to be predominantly Taos Gray-Sopris Plain, but incised wares, presumably both Taos Incised, traded from the Upper Rio Grande, and a locally made imitation, appear during Early Sopris. Some cordmarked pottery, polished wares, and corrugated wares are present, along with occasional Taos Black-on-White and Red Mesa Black-on-White. Other artifacts include trough metates -- which replace basin metates -- shell and stone disk beads, turquoise, and the other artifacts found in Initial Sopris. Maize is present but hunting and gathering apparently still predominated. Chronology is based on archeomagnetic dates and datable trade sherds.

The Late Sopris phase, A.D. 1150-1225±, is characterized by architecture consisting of unfaced, horizontally laid, unmortared sandstone slab masonry, which replaced adobe construction. Corners are curved and posts are occasionally incorporated in the walls, presumably as roof supports (Wood and Bair 1980: 231). During this phase Taos Gray Incised with herringbone motifs predominates, but Taos Gray-Sopris Plain is abundant. Cordmarked and polished wares are less common than in the previous phase. Red Mesa Black-on-white also decreases, while Taos Black-on-white increases. Reexamination of sherds originally identified as Santa Fe Black-on-white proved that identification to be in error. Since Santa Fe Black-on-white became common in the Upper Rio Grande area about A.D. 1250, essentially replacing Taos Black-on-white, it seems likely that this change would be reflected in the Trinidad area if the Pueblo-related complexes there had lasted much beyond A.D. 1225. Changes in other artifacts include the appearance of grooved

mauls and the replacement of trough metates by slab metates. One archeomagnetic date is available for Late Sopris.

No archeological complex in the Trinidad area dated between A.D. 1225 and the early 1500s has been linked archeologically and/or ethnohistorically with Apacheans. However, on the basis of a dental anomaly, three roots on the first mandibular permanent molar, Turner (1980) suggests the possibility that the Sopris phase people may have been Athabascans. Only three individuals out of 13 showed this trait. Its distribution in the plains is not known and it does occur, at a lower frequency, in southwestern and western groups. Therefore, the identification of the Upper Purgatoire complex as Athabaskan should be considered with utmost caution.

The second oldest level at Trincheras Cave, about 100 km east of Trinidad, Colorado, is characterized by the presence of Taos Gray and Santa Fe Black-on-white sherds, and a higher percentage of corner-notched points than occurs in the upper level (Wood-Simpson 1976). This second level could date from about A.D. 1100-1350, although if the two pottery types represent a single occupation, a date in the 1200s would be suggested. The other artifacts, including unnotched points, would not be out of place either in contemporaneous Southwestern complexes or in the Panhandle aspect, but in general the second level reflects ties to the Southwest, while the upper level has Panhandle relationships.

In the upper level was found the remains of a Jacal structure which may also have incorporated caliche slabs. On the basis of Stamper Cordmarked pottery (curiously unfired), and various artifacts characteristic of the Antelope Creek focus, occupation of the upper level was identified as Panhandle aspect.

Anasazi-Related Phases in Northeastern New Mexico

In prehistoric times there appear to have been movements of Pueblo culture and probably people into northeastern New Mexico from two centers farther west. The southern thrust, from the Santa Fe area, is well known from the lower levels at Pecos Pueblo and the nearby ancestral Forked Lightning site. This complex is also represented by numerous smaller sites along the Pecos River, between where it leaves the mountains near Anton Chico and Pecos and from the once-large and now nearly destroyed Tecolote site about 16 km south of Las Vegas. Other, mainly small, sites are found along the eastern foothills of the Sangre de Cristo mountains along streams that drain into the Pecos River, with at least one site near Watrous (Lister 1948) on the Mora River, a tributary of the Canadian. The Pueblo sites farther north along the foothills, all in the Canadian River drainage, have their closest relationship to sites in the Taos area.

Evidence of Anasazi occupation in northeastern New Mexico has long been noted (Bandelier 1890-1892, Moorehead 1931, Holden 1931, Mera 1935) but only in recent years has the large number of sites east of the Sangre de Cristos been realized, partly as a result of work done by Glassow (1972, 1980), who located some 300 sites in southwestern Colfax County and carried out extensive excavation of a limited number of these sites on the Philmont Boy Scout Ranch, as a part of its archeological program. Glassow has defined seven phases, three Anasazi-related, for the Cimarron, New Mexico area. He assigned about half the sites recorded to one or more of his temporal phases, and admits that most of the assignments are rather tentative, especially where he suspects two or more phases to be represented at a single site. I agree with Cordell (1978: 35) that the definition and dating of these phases is still open to question. It is based on an extension, through ceramic similarities and trade sherds, of the chronology from the Taos area, which is itself open to question. Although Glassow's phases can, at best, be considered tentative, they provide a beginning for the ordering of Anasazi prehistory in the area.

The dynamics of Pueblo culture development in the Upper Rio Grande area are far from being well understood, and the situation in the Cimarron area, which apparently has its strongest ties with the Taos area some 65 km to the west, is even more of a puzzle. In order to understand Cimarron area prehistory, there must be (1) extensive excavation at sites where each of the proposed phases is represented, (2) extension of dendrochronology into the area, and (3) a detailed analysis of the pottery found there to determine (a) which is locally made and (b) the source of trade sherds.

The earliest archeological complex in the Cimarron area with a well-defined ceramic tradition has been defined by Glassow (1980: 73) as the Escritores phase, for which he suggests a date of A.D. 900-1100 based on the presence of sherds identified as Kiatuthlanna and/or Red Mesa Black-on-White. This dating is seriously questioned by Cordell (1978). The associated utility ware is a "coarse sand-tempered, often neck-banded gray ware which is similar or identical to Kana's Gray." The only structure known for this phase is a deep circular pit house with four center posts, a collared fireplace, and a ventilator shaft toward the east.

Following the Escritores phase is the Ponil phase dated at A.D. 1100-1250 on the basis of associated Taos or Kwahe's Black-on-white, Taos Incised, and/or punctated sherds (Glassow 1980: 74). Although three of the four excavated sites assigned to this phase are rock shelters, the fourth included a three-room surface structure incorporating stone slabs in the walls. In addition to the pottery and stone artifacts found in thick middens at open sites, rock shelters have yielded yucca-leaf sandals, basketry, a rodent-skin bag, maize cobs and husks, and cucur-

bit seeds.

The final Anasazi phase in the Cimarron area has been designated the Cimarron phase and dated A.D. 1200-1300 (Glassow 1980: 74-75). Earlier, Baker (1964) had included these sites in the Ponil phase as he originally defined it. It is during this period that the largest sites in the area were occupied and the mouths of Cimarron and Ponil canyons densely settled. The ceramics of this phase continue to be dominated by plain gray ware, often with incised or punctated decorations on the upper half of the vessels. Glassow has proposed a new pottery type, Cimarron Plain, for the utility ware of the Cimarron phase, but the difference between this and the very similar preceding pottery, Taos Plain and Taos Incised, which are described as cruder, is not at all clear. In fact, the plain gray pottery of the still earlier Escritores phase, identified as Kana's Gray by Glassow, is also virtually the same if the neck-banded portion of a vessel does not happen to be in the sample. Another distinction made is that Black-on-white sherds with organic paint (Santa Fe Black-on-white) appear at sites of the Cimarron phase for the first time. Mineral paint types (*e.g.*, Taos Black-on-white) continue. Other pottery types, including indented corrugated and basketry impressed, appear in the Cimarron area in small numbers as well as in the Taos area (Wetherington 1968: 48; Herold 1968: 26).

The structures of the Cimarron phase are substantial. In the middle Ponil canyon one masonry structure measures 17 by 6 m, with a masonry partition lengthwise through the middle. One of the two rooms thus formed was excavated and found to be itself divided into four rooms with coursed adobe partitions (Glassow 1980). Along the Cimarron River, just below the mouth of the canyon, are stone wall bases of small multiroom structures on which adobe walls were presumably built. A 5 km section of the lower Ponil canyon apparently contained the most dense settlement of the phase. Limited excavation in three of seven closely spaced house mounds revealed coursed adobe walls forming rectangular surface rooms of varying sizes. One room can best be interpreted as a rectangular above-ground kiva. Another structure had been at least two stories high (Gunnerson n.d.). In the limited testing done no internal support posts, such as were found at Pot Creek Pueblo in the Taos area (Wetherington 1968), were found.

CHAPTER FIVE

THE LATE CERAMIC PERIOD

A date of ca. A.D. 1500 marks another change in the culture history of the plains. At about this date, there was a cultural adjustment to more normal climatic conditions after much of the Central High Plains had been subjected to severe droughts with a concomitant depopulation. Also, starting shortly after A.D. 1500, there are written documents that mention the Indians of the Plains and help identify archeological complexes with particular tribes. Athabascan speakers appeared from the north and for the next two centuries dominated the Central High Plains where Caddoan speakers had once been the only occupants. Not many years after the arrival of the Apaches from the north, Spaniards thrust from the south into New Mexico and then eastward into the Central Plains. There, beyond the Apache buffalo hunters, they found Caddoan villagers who continued to present a nearly solid block immediately to the east of the High Plains until it was penetrated by first Siouan and later Algonquin speakers from farther east. By the mid-1700s there was considerable turmoil throughout the plains with Shoshonean speakers coming in from the west as well. The next century saw accelerated decline of older Plains cultures and the rise of the pantribal, horse-oriented, culture that quickly vanished in the mid-1800s with White settlement of the plains. A date of about A.D. 1750 would be a reasonable terminal date for the period called "Late Ceramic" for soon after that date pottery-making started to decline as village complexes became decadent. What is here called the Late Ceramic period, also commonly referred to as the Protohistoric, is followed by a fully historic period.

Within the Late Ceramic period, we will be concerned with the limited evidence of Shoshonean archeology along the foothills of the Rockies, the Dismal River aspect (protohistoric Plains Apache) which dominated the Central High Plains, the White Rock aspect (probably Siouan) which is on the eastern edge of the Central High Plains later in the Late Ceramic period, the Great Bend aspect (protohistoric Wichita) immediately to the east and the Lower Loup aspect (protohistoric Pawnee) immediately to the northeast of the Central High Plains.

Shoshonean Archeology

Shoshone occupation is demonstrated in the Colorado foothills at a site near Tiny Town, some 16

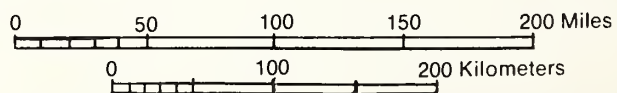
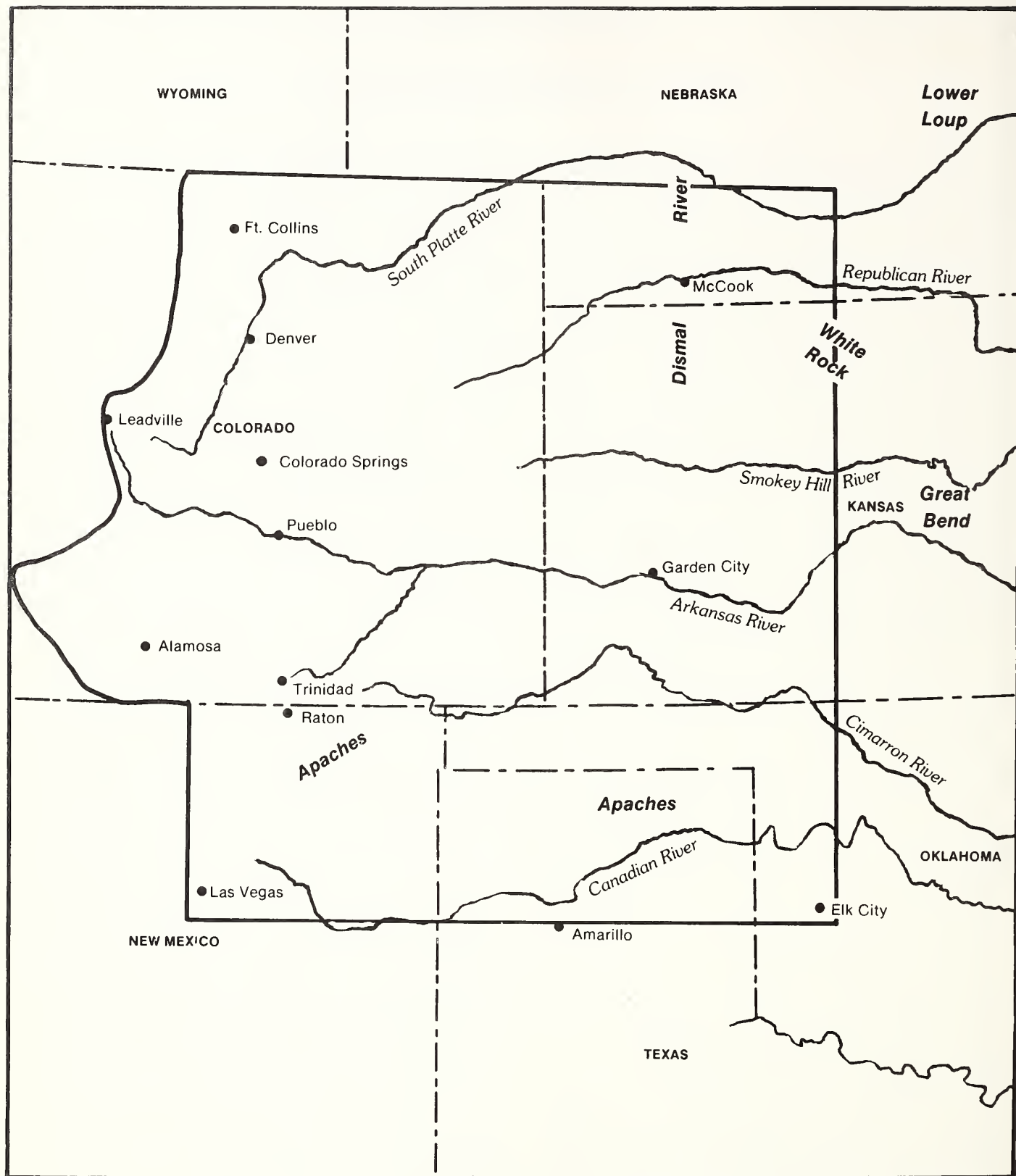
km southwest of Denver. Here a flat-bottomed ceramic vessel is reported from the Graeber Cave site, 5 JF 8 (Nelson and Graeber 1966). The cave, which opens to the south, overlooks Turkey Creek, which provides an easy route between the Denver basin and South Park. In the occupation level of the cave there was a rock-ringed hearth and a few chipped stone artifacts in addition to the sherds, apparently all from a single vessel. One point was triangular and unnotched, about 3 cm long. The other, also triangular and about the same size, was corner-notched leaving a parallel-sided stem about 0.8 cm wide; blade edges were serrated. Two point fragments and an end scraper were also recovered.

The pottery, the first Shoshone pottery vessel reported from Colorado, resembles Intermountain Tradition ware found in Wyoming which has been reported by Wedel (1954: 404), Mulloy (1958: 197) and Frison (1971, 1978: 64).

There is no direct dating of the flat-bottomed Shoshone ware, but the authors feel that it dates from about A.D. 1500. If this is the case, as they point out, the corner-notched point probably represents another, earlier occupation of the cave, since it is of a type that would predate A.D. 1000.

White Rock Aspect

The White Rock aspect, comprised of the Glen Elder and Blue Stone foci, has seemed something of an anomaly in plains archeology. This complex has been known and described in print for nearly 50 years, since Wedel (1935b: 227-229) reported his Beloit 2 site near Glen Elder, Kansas. He noted close similarities between the material from Beloit 2 and material from a site on nearby White Rock Creek, Jewell County, Kansas, that was in the A.T. Hill collection in the Hastings, Nebraska Museum. Perhaps this latter site is the Warne site (25 JW 1) referred to by Wedel (1959: 534-535). In 1937 a party from the Nebraska State Historical Society excavated two sites on White Rock Creek, Kansas, and carried out limited excavations at a site on the Solomon River at Glen Elder, Kansas (Hill and Cooper 1937: 245). This work was reported by Rusco (1960: 44-71) who, strangely, does not mention Wedel's 1935 work and does not cite the publication by Hill and Cooper (1937) whose work she reports. Smith (1949a) visited the Beloit 2 site, designating it 14 ML 1, and also noted a similar site



SELECTED LATE CERAMIC COMPLEXES

(14 JW 1) upon which a George Warne lived, near where Kansas Highway 14 crosses White Rock Creek. In 1951 and 1952 parties from the Missouri River Basin Survey visited these sites, but contributed no additional information regarding them.

In 1950-1952, the University of Nebraska Laboratory of Anthropology excavated at the Blue Stone (25 HN 44) and Green Plum (25 HN 39) sites that were to be flooded by the construction of the Harlan County, Nebraska dam. Mention of this work was made by Cummings (1953) and a full report was published by Rusco (1960). A tree ring date of A.D. 1614 from an outside ring (near bark) was arrived at by Harry Weakly (1962: 142). This is apparently the only tree ring date for any of the White Rock aspect sites.

Wedel (1935b: 229) recognized the Beloit 2 site as different from others in the area and suggested a relationship to some sites in central Kansas. Kiehl (1953) assigned sites 14 ML 1 and 14 JW 1 to the Glen Elder focus of the White Rock aspect. Stephenson (1954), reporting the consensus of a committee, agreed on these focus assignments and tentatively added site 14 JW 2 to the Glen Elder focus. The committee was undecided as to whether these foci should, in turn, be assigned to the Oneota aspect or to a new White Rock aspect. Wedel (1959: 534-535) was emphatic that these sites "are not Oneota, though they clearly share some traits with that aspect."

The following summary of the White Rock aspect is based on Rusco (1960) who describes and tabulates traits from four sites: two from the Glen Elder focus in north-central Kansas and two from the Blue Stone focus in south-central Nebraska. For the most part, artifacts from one of the Kansas sites were not accessible to her, but notes she cited indicated that they were similar to those from the other Glen Elder focus site.

The sites of the two foci apparently had different functions. Those in Kansas were situated on ridges well above stream bottoms, and showed evidence of semipermanent occupation in the form of houses and bell-shaped storage pits, not found at the Nebraska sites. The latter were situated on low land along a stream and one was subject to near annual flooding; the other was on a low terrace just above the flood plain. The remains of two houses were excavated at 14 JW 1: both were more or less square with rounded corners and measured 8 and 6.7 m across. The floor of one was about 30 cm deep and the other just below the plow zone. In the center of each was a shallow basin-shaped hearth surrounded by four post holes roughly forming a square. One had six additional post holes which formed no particular pattern and the other had one additional post hole and an inside storage pit. No evidence of entrances is reported. Site 14 ML 1 may also have had house structures, but this is not certain. Scattered about all four sites were shallow basin-shaped pits, containing a limited amount of detritus.

The artifact assemblages from the two foci were very much alike except that grooved mauls, boat-shaped shaft smoothers, scoria abraders, catlinite pipes and bone tools were reported from the Glen Elder focus and not from the Blue Stone focus. This may reflect, at least in part, the fact that the Kansas sites were semipermanent horticultural villages while the Nebraska sites were temporary camps, even though they did cover extensive areas.

Projectile points were predominantly small and triangular, with straight or concave bases and without notches; a few were side-notched. Stemmed (corner-notched) points were very rare. Knives were four-sided (diamond-shaped) with alternate-bevel edges, but a few oval and triangular specimens were also found. Plate jasper knives were common in Nebraska and absent in Kansas. Keeled and flat end scrapers, crude scrapers or choppers bifacially sharpened, and numerous modified flakes were found. Bone artifacts, found only in Kansas, included: bison scapula hoes with unmodified articular ends, bison scapula knives, a bone awl or flaker, a bird bone awl, a possible beamer made from a worked rib, worked cancellous bone, and shell beads. Faunal remains included bison (by far the most common), rabbit, elk (?), canid, turtle, mollusk and unidentified mammal. The nonceramic inventory would be compatible with that of almost any early historic or protohistoric plains complex; it is the pottery that is distinctive and diagnostic. Although the sample from the Blue Stone focus is smaller, the variation is slightly greater, so the description of Blue Stone pottery will suffice for the aspect. The vast majority of sherds from the aspect are classified as

"Walnut Decorated Lip" which was described by Rusco (1960: 30-33). A few aberrant sherds, including one with shell tempering and trailed-line decoration, are probably intrusive.

Although Wedel resisted assignment of the White Rock sites to the Oneota aspect, there are enough similarities for the idea to have been considered. The nearest Oneota site, the Fanning site in northeast Kansas (Wedel 1959: 131-170) and the Leary site in southeastern Nebraska (Hill and Wedel 1936), are located essentially straight east of the White Rock sites. The Oneota aspect, tentatively attributed to the Chiwere Siouans, is comparable in age to the White Rock aspect for which a Kansa (Dheghia Siouan) authorship has been suggested but not proven. Wedel (1959: 600-615) discusses this problem rather thoroughly.

Lower Loup Focus

No Lower Loup (protohistoric Pawnee) sites are known from the Central High Plains, but the very absence of these probable descendants of Upper Republican peoples is of interest for our reconstruction of High Plains culture history. Their sites, all substantial villages, lie in a very limited area near the

mouth of the Loup River in east-central Nebraska. In spite of repeated extensive excavations at various of these, there is no substantial site report or thorough overall synthesis. No attempt will be made here either to present such a synthesis or to provide an exhaustive bibliography for this key complex. By far the most thorough treatment of any part of the complex is Grange's (1968) *Pawnee and Lower Loup Pottery*. The most extensive general treatment of the complex is still that presented by Dunlevy (1936). Wedel (1961a: 108-111) provides a good brief summary and earlier did much to establish the relationship between Upper Republican, Lower Loup and Pawnee (Wedel 1936, 1938). Strong (1935: 55-68, 1940) also dealt with this relationship. There is general agreement that Lower Loup developed into at least some bands of Pawnee in the Lower Loup area. Most plains archeologists support the idea that Upper Republican people moved north to the Missouri River in southern South Dakota, perhaps to the Arzberger site, for example (Spaulding 1956), and returned to eastern Nebraska as proto historic Pawnee. As pointed out earlier, Ludwickson (1975, 1978) has suggested that the Loup River phase of Upper Republican is the immediate ancestor of the Lower Loup focus, an idea that has not yet gained general acceptance.

Lower Loup sites are particularly numerous along the north bank of the Loup River a few kilometers in either direction from Genoa, Nebraska. Villages of 6 to 40 ha occupy high terraces or bluffs overlooking. These communities consisted of many round earth lodges, 8 to 15 m in diameter, with floors 30 to 65 cm deep. Surrounding a central fire basin and about half way between it and the wall were four substantial center posts. A second series of 8 to 16 smaller posts was located about 1 m from the wall, and a third series of closely spaced small posts was set either at the edge of the floor or on the ground surface just beyond the edge of the house pit. A long covered entrance extended away from the prevailing wind, often to the east. Cache pits were dug into the house floors and there was commonly a raised altar against the wall opposite the entrance.

Pottery, very abundant at Lower Loup sites, is grit-tempered, well-made and varied in form. The most distinctive feature is the presence of many closely-spaced handles around the rim, giving a "cloistered" effect. The surface is usually simple stamped and incised decoration is common on the upper body. Designs are commonly a series of triangles filled in with parallel lines. The decoration suggests influence from complexes occurring on or near the Missouri River in South Dakota. Lower Loup pottery has been found at Great Bend sites in Kansas, and vice versa (Wedel 1959: 576, 586).

Other artifacts include small triangular projectile points, stone knives, scrapers, drills, L-shaped elk-horn scraper handles for stone blades, toothed

bison metapodial fleshers, bison scapula digging tools, bone needles, bone paint brushes, and catlinite ornaments and pipes. These artifacts are all characteristic of various protohistoric plains complexes. Stone metates and manos are conspicuously scarce; corn was probably ground in wooden mortars.

Lower Loup subsistence was based on a combination of hunting and horticulture which, judging by the many large cache pits, must have been highly productive. Single flesh burials have been found in and near the villages. A few items of non-Indian manufacture occur at Lower Loup sites, but no Southwestern sherds or turquoise artifacts have been reported. On the basis of archeological and historical evidence Grange (1968: 127) dates the Lower Loup focus from A.D. 1500 or 1550 to 1750 or 1775. By 1775 historical documents permit the identification of individual sites as Pawnee.

Great Bend Aspect

One of the richest complexes in the Central Plains is the Great Bend aspect, representing the protohistoric Wichita. Known sites are almost entirely on those tributaries of the Arkansas River coming into it from the left (north or east side) in central and south-central Kansas. Only the two westernmost Great Bend sites, those at Larned, Kansas, are in the area we have defined as the Central High Plains, and these two only by about 4 km. As one would expect on the periphery of an area, these sites are very small by Great Bend standards, but one is especially important because of the information it has provided on houses. No Great Bend sites have been reported from north of the Smoky Hill River or from south of Kansas although it is probable that some will be found in northern Oklahoma.

Archeological investigation of the Great Bend complex began in the late 1800s with the work of Udden (1900). Since 1940, Wedel has furthered knowledge of the aspect greatly through systematic and repeated excavation at Great Bend sites for the Nebraska State Historical Society (Wedel 1935c) and for the Smithsonian Institution (Wedel 1940a, 1941b, 1942, 1949, 1950, 1959, 1961a, 1967, 1968a, 1968b, 1970b, 1970c, 1975, 1976, 1977; Wedel and Wedel 1976). The University of Kansas (Smith 1949a, 1949c) and the Kansas Anthropological Association (Monger 1970) have contributed important additional information. The most extensive and detailed treatment is to be found in Wedel (1959). It, along with the publications of Wedel in 1949 and Monger in 1970, provides the basis for this summary.

A very distinctive structural feature of the Little River focus of the Great Bend aspect is known from five nearby sites near the divide between the drainages of the Arkansas and Smoky Hill Rivers. These earthworks, generally called "council circles" are probably of a calendrical and/or ceremonial nature (Wedel 1959, 1967, 1968c, 1977). In general the pat-

tern consists of two concentric elliptical depressions 30 to 60 m in maximum diameter, surrounding a low central mound 18 to 27 m in diameter. The outer depression represents a broad continuous ditch while the inner depression is made up of four elongate curved basins which had apparently been roofed over in some manner. Near the center of the circle is evidence of a substantial fire, and cache pits are sometimes associated. Usually the fill of the basins contains disarticulated and partially articulated human skeletons; an occasional articulated skeleton appears to be of a body that was thrown into the pit with no concern for position or orientation. Also in the fill is evidence of a superstructure, consisting of charred beams, fired pole-impressed clay, and pieces of sandstone up to 100 kg. Some of the detritus apparently represents material that was in the structures when they burned, as well as general village refuse. Numerous large (up to 2.5 m deep) cache pits are found at these sites but no evidence of domestic architecture. The alignment of some of these sites suggests solstice observation points, and Wedel suggests that the skeletons might represent human sacrificial victims, although many are clearly secondary burials. The bodies or skeletons were apparently not in the structures when they burned.

These "council circles" are in marked contrast to the dwellings of the Great Bend aspect. Archeological evidence of such structures has been reported by Monger (1970) from a site in the edge of Larned, Kansas, at the extreme western limit of Great Bend distribution and just barely within what we have defined as the Central High Plains. The Larned site (14 PA 307) is located at the confluence of Pawnee Creek and the Arkansas River, in an area that floods occasionally even now and that flooded repeatedly during the periods of occupation. After each flooding, which left a layer of silt, new houses were built. The lowest zone is assignable to the Smoky Hill aspect. The second zone from the bottom, attributed to the Pratt focus, was separated from the Smoky Hill occupation by 60 cm of nearly sterile fill. The third zone, representing the Great Bend aspect, was separated from the second by 45 cm of layered fill that contained artifacts and detritus but no structures. Within the 52 cm-thick Great Bend zone were three occupation levels, each with structures. In the upper 34 cm of fill was a fourth component, of unknown cultural affiliation, characterized by a pottery type called by Monger "Larned Fine Line".

Within the Great Bend zone Monger uncovered the remains of 5 structures in the upper layer, 3 in the middle layer and 3 in the lower level. In addition to these 11 complete patterns, he found sections of about 22 others that lay primarily in adjoining, unexcavated, portions of the site, of which the 12 by 12 m section excavated probably represents only a small portion. The three houses in the lower level had been only about a meter apart, and had burned, probably at the same time. All 11 Great Bend houses

conform to much the same pattern. They are circular to slightly elliptical with maximum diameters of 3 to 5.5 m. The perimeters are represented by small conical post holes: 49 in the case of a 5.5 m house; 21, 23, and 23 in the cases of 3, 4, and 5 m houses, respectively. Found in at least some of the houses were molds of small pegs which had been driven in beside the posts, presumably to lash the grass-covered structure to the ground. In the center of each house was a simple fire basin, to the east of which was often a post hole thought to represent a crane post. Other post holes were sometimes present, and in one case an apparently flimsy structure had been rebuilt or strengthened with additional posts. In one house, gaps in the post ring suggested entrances to the north and south.

There is little doubt that these structures correspond to the grass-covered domed structures described by Coronado (Hammond and Rey 1940) and Onate (Hammond and Rey 1953) in 1541 and 1601 for the Quivira Indians and known ethnographically for the historic Wichita (Bushnell 1922: 179-181; Fletcher 1907; Douglas 1932). Furthermore, their location in the bottomlands, which were subject to flooding, would put them in and among the gardens, the situation recorded by the sixteenth century Spanish explorers. The need to conserve precious bottomland could account for the houses being so close together. The artifact inventory from the Great Bend zone at the Larned site corresponds well with that described by Wedel for the complex as a whole, although no artifacts of non-Indian manufacture were recovered.

Pottery

Descriptions of the four major Great Bend pottery types, Cowley Plain, Geneseo Plain, Geneseo Red Filmed and Geneseo Simple Stamped (Wedel 1949)

In addition to these types, there is a small but consistent occurrence of cord-roughened sherds described by Wedel (1959: 242) as thin, hard, and "characterized by a fine compact dark-gray paste, with somewhat coarser and less abundant gravel inclusions than are found in the non-cord impressed wares; the sherds are 3.5 to 7 mm thick, and hardness is 4.5 to 5.5. Medium to fine cord impressions, often much worn or rubbed down, cover exterior surfaces." Except for the cord roughening, the sherds are not easily distinguished from Geneseo gray wares.

Other Artifacts

Chipped stone tools are well made and abundant at Great Bend sites. Carefully fashioned small to medium-sized plano-convex end scrapers contrast markedly with the crude end scrapers of other contemporaneous cultures. Almost equally common are side scrapers, usually with a single scraping edge,

in a variety of forms. Projectile points are small, delicate and basically triangular. They are of the typical late prehistoric and protohistoric form except that unnotched points greatly outnumber side-notched. A few points of other, widely varied forms are also found. Bifacially chipped knives include alternately beveled forms with two or four edges and unbeveled forms in a variety of shapes; a few are notched for hafting. Some drills have expanding bases, others are medium to heavy plain-shafted forms, and some are stemmed. Large crudely flaked choppers, some with shallow notches for hafting, are found but not especially common.

Ground and pecked stone artifacts are also abundant. Grooved mauls occur in a wide variety of sizes and forms; some are very carefully fashioned, with flanged grooves, while others are partially grooved cobbles. Metates or milling slabs may have either elliptical depressions or troughs indicating to-and-fro grinding. Both one- and two-hand manos are found. There are grooved sandstone arrow-shaft smoothers of the type used in pairs, plus abraders of various shapes used for sharpening or shaping other artifacts. The typical stone pipe is L-shaped, with a tall cylindrical or bulbous bowl and a short stem. Other pipes have low bowls and still others are simple tubes. Some pipes are of catlinite, some are of another red stone, and a few are of steatite. Perforated and unperforated sandstone disks, up to 7.6 cm in diameter, are of unknown function. The catlinite documents trade connections to the Minnesota area, painted pottery and turquoise indicate contacts with the Southwest; a green stone of unknown source was made into celts, and quartzite apparently came from northeastern Kansas.

Bone artifacts include numerous bison scapula digging tools. In the Little River focus of central Kansas, the articular end (the glenoid fossa) is commonly removed, while in the Lower Walnut focus of south-central Kansas, it is commonly socketed, or a groove is cut into the dorsal surface for purposes of hafting. This socketing approach is reminiscent of the way bone tips are attached to digging sticks as well as to scapula digging tools in earlier Oklahoma and Texas complexes. Bone awls have flat, round, or triangular cross sections and are made from edges of bison ribs or neural spines. Arrow-shaft straighteners are made from bison ribs in the Little River area and deer tibia on the Lower Walnut. Other bone artifacts include transversely scored ribs ("musical rasps" or "tallies"), paint applicators and hide processors, both of cancellous bone, and tubular beads. The serrated bison metapodial flesher, common to most protohistoric complexes of the Central Plains, is known only from a single surface find at a Great Bend site near Larned, and that site is only 1.6 km from a site assignable to the Dismal River aspect, of which such fleshers are characteristic. Four-sided or cylindrical stemmed and pointed bone artifacts were probably projectile points. Additional bone

artifacts of types not previously reported for the Little River focus came from the Tobias site (Wedel 1968b: 57). These include: deer leg-bone shaft wrenches, metapodial digging stick tips, deer mandible sickles or graters, incised mammal bone tubes, and single-stop bird bone whistles. The first four of these are well known from the Washita River, Custer and Antelope Creek complexes of Oklahoma and Texas. Antler artifacts include socketed, conical projectile points, scoop-like tines, grooved knife handles (?), and eyed needles (?). Shell artifacts include disk beads, pendants, and spoons or scrapers.

Artifacts of non-Indian manufacture from Little River focus sites include fragments of chain mail, an iron axe, a large iron knife blade, double-pointed iron awls, rolled sheet copper or brass beads, and glass beads. The beads, described in greater detail by Wedel (1968a: 373), are all of a single type: a "pea-sized blue or aquamarine bead, sometimes showing deep weathering in cross-section and often with tiny air bubbles present." Smaller glass beads have been found on the surface, but these pea-sized beads have been found at four sites, some *in situ*.

Larned Fine Line Complex

This material is reported from the topmost zone at the Larned (Kansas) site (14 PA 307). The complex is defined almost entirely on the basis of the pottery, called "Larned Fine Line," which was stratigraphically above, and not mixed with, the Great Bend aspect material at the site. Decoration includes incised lines on the shoulders, tool impressions on the lip, pinch marks on the lip, and pinch marks on the rim about halfway between the lip and neck. The exterior of the vessels shows well defined simple stamping, sometimes an unusually wide grooved paddle. Monger, who has handled a great deal of pottery from central Kansas, has seen this ware at only one other site, 14 PA 301 (located about 1 km southeast of the Larned site) where it was apparently associated with Geneseo Simple Stamped (Great Bend) pottery and "Rio Grande pottery which dated 1525 to 1575" (Monger 1970: 3, 15). Larned Fine Line bears some resemblance to Lower Loup pottery from Nebraska. The artifacts associated with this pottery at the Larned site are not described.

Dismal River Aspect

As will be discussed in the Ethnohistory section, Apacheans are known to have been on the Central Plains in the early 1500s, the probable time of their arrival from farther north as bison hunting, dog nomads. Although Apachean sites of the 1500s have not yet been identified, they are certain to exist. Thus far, sites identified as Apachean in the Central Plains are those assigned to the Dismal River aspect, which represents a semisedentary, horticultural, pottery using phase that apparently postdates the

time when the Apaches were friendly with Caddoan farmers and could live near them in the winter and trade for corn. Direct dating, based on dendrochronology and associated Southwestern trade pottery, places Dismal River at about 1675-1725 (J. Gunnerson 1960, 1968), although documentary evidence, to be discussed later, indicates that this way of life was probably established by about 1640.

The Dismal River aspect received its name from the Dismal River, a very pleasant stream in the Sand Hills of northwestern Nebraska, where distinctive artifacts of the complex were first found. During the early 1930s, W.D. Strong (1932, 1935), W.R. Wedel (1935) and A.T. Hill identified components of this aspect at various sites in western Nebraska and suggested an Apache authorship as one possibility. In 1939 the Nebraska State Historical Society excavated Ash Hollow Cave in west-central Nebraska and found Dismal River pottery in the uppermost layer, stratigraphically later than Upper Republican (Champe 1946). The same year, excavation was carried out in Chase County, southwestern Nebraska at the Lovitt site (25 CH 1), probably the largest of the known Dismal River villages, and at the nearby Nichols site (25 DN 1). This work (Hill and Metcalf 1942) greatly increased the Dismal River artifact inventory, especially with regard to structures. Also in 1939 Wedel (1940a; 1959: 422-468), of the U.S. National Museum, excavated at the Scott County Pueblo site in west-central Kansas and recognized that, except for the seven-room pueblo itself, most of the material could be assigned to the Dismal River aspect. The pueblo had been excavated previously, in 1898, by H.T. Martin, who had eventually concluded that it had been built by refugee Taos or Picuris Indians in the mid- or late 1600s (Williston 1899; Williston and Martin 1900; Martin 1909).

In 1948 the University of Nebraska started holding its summer archeological field schools at White Cat Village (25 HN 37), a Dismal River site in Harlan County, south-central Nebraska (Champe 1949; J. Gunnerson 1960). In 1949 the Nebraska State Historical Society excavated at three Dismal River sites, the Humphrey site (25 HO 21) and two smaller ones, in Hooker County, northern Nebraska not far from the original sites on the Dismal River (J. Gunnerson 1960). Dismal River pit houses were excavated in the 1950s by the University of Colorado at Cedar Point Village near Limon, Colorado (Wood 1971).

In 1964 Gunnerson conducted a reconnaissance in central and western Kansas and excavated at selected Dismal River sites the following year (J. Gunnerson 1968). The Wells site (14 BT 404) near Great Bend, previously tested by members of the Kansas Anthropological Association (Anonymous 1961), had been occupied mainly by Great Bend people but had a Dismal River component. A single, Dismal River house was uncovered at the Reed site (14 PA 304) near Larned. Testing around the Pueblo

(14 SC 1) in Scott County failed to disclose any Apache structures, but, about 0.5 km to the north, one was excavated at the Ledbetter site (14 SC 111) and one at the Coffin site (14 SC 106). Witty (1971a, 1971b) re-excavated the Scott County Pueblo and reconstructed the original wall bases for the Kansas State Historical Society.

General discussions of the Dismal River aspect have been published by J. Gunnerson (1960, 1968) and by Wedel (1959: 589-599). D. Gunnerson (1974) established that ca. 1730 many of the Dismal River people eventually joined the Jicarilla Apache, to become their Llanero band, and suggested that others probably joined the Lipan. Gunnerson and Gunnerson (1971: 19) postulated that the northernmost Dismal River people, those of the Sand Hills and Badlands, probably represented by sites as far north as the Black Hills, became the so-called Kiowa Apaches. The end of the Apache domination of the Central Plains (and the end of the Dismal River aspect) in the late 1720s was brought about by hostile pressure, primarily from the Pawnee on the northeast, and Comanche to the west and southwest (D. Gunnerson 1974).

Distribution and Subsistence

Dismal River sites are found between the Rocky Mountains and the 99th meridian and from the Black Hills south to the Oklahoma Panhandle. The villages, however, are nearly all in the eastern half of this area, probably reflecting conditions more favorable for horticulture. However, the average rainfall is only about 50 cm per year even at the major villages. The western sites may have been occupied only temporarily, probably in connection with non-horticultural activities.

The main resource of the Dismal River area was grass pasture for the great herds of bison that the Apacheans utilized with such consummate skill. In the eastern half of the area bottomlands along small permanent streams provided garden plots, and it is in such places that Dismal River villages are situated. At the Scott County, Kansas Pueblo site, there was evidence of irrigation ditches, probably Apache, leading from an unusually productive spring. Subsistence was based primarily on hunting, with horticulture a secondary, perhaps mainly gustatory, consideration. Bison was the main animal hunted, but deer, beaver, turtles and dogs are represented in the faunal assemblage and were presumably eaten. Bird bones and mollusk shells are rare and evidence of fish has yet to be found, perhaps reflecting the once-common Apache fish taboo. Seeds of wild plums and chokecherries as well as black walnut shells have been recovered. Corn and squash or gourds, represented by charred remains, were presumably cultivated. The apparent low row numbers of the limited corn samples (J. Gunnerson 1968: 185) suggests that it was probably of a plains rather

than southwestern origin (cf. Galinat and Gunnerson 1963).

Villages and Structures

Dismal River villages covered as much as 185 ha. Houses are scattered, perhaps tending to be grouped in small clusters, but with no apparent concern for defense. The typical Dismal River house consisted of an unprepared floor at or just below ground level, and some sort of pole and earth roof. The latter was supported by five center posts set vertically in a circle 3 to 4 m in diameter. These base posts were presumably joined by stringers against which small wall poles were leaned, enclosing an area with a diameter about twice that demarcated by the center posts. In some cases two additional posts set on this outer circle at the east side probably supported an entrance, perhaps dormer-like. The five base-post pattern was dominant at White Cat Village, was represented by one of two houses at the Lovitt site, and by the one house at the Ledbetter site. One house at White Cat had six center posts. The houses at the Reed and Coffin sites each had four center posts. The pattern of one house at the Lovitt site is uncertain, perhaps due to rebuilding.

The five base-post pattern, in Plains archeology unique to Dismal River, is probably related to the five-post pattern of the old style forked-stick Navajo hogan (Mindeleff 1898) although the structures were quite different. The Dismal River house was perhaps similar to the conical structures, such as the Mandan and Hidatsa eagle trapping lodges (Wilson 1934), found also at various Arikara sites (Lehmer 1971: 113). They may have been influenced by the Plains earth lodge such as that built by the contemporaneous Lower Loup Pawnee, or by the Wichita grass house, or both. In any case one might describe the Dismal River dwelling as a Navajo forked-stick hogan with the five religiously prescribed posts set vertically and used like the center posts of a plains earth lodge, thus giving more space inside.

Characteristic of most Dismal River villages, and especially common at the Lovitt site, are irregular trash-filled pits, perhaps originally borrow pits for earth to cover houses. Cache pits, used by all other plains village groups for storage of corn, have not been found at Dismal River sites.

Bell-shaped baking pits, in the plains diagnostic of Dismal River, are found at villages in southern Nebraska and Kansas and at a nonceramic site in southwest South Dakota. In the Southwest, however, they are found not only at Apache and Navajo sites, but at Pueblo sites as well (J. Gunnerson 1968: 175). They were used until recently by the Jicarilla Apaches for cooking green corn. These pits, heavily burned and about 1 m in depth and maximum diameter, constrict at the mouth. At one Dismal River site in Scott County, Kansas, a baking pit contained a burial (J. Gunnerson 1969a) as did one in

southwestern South Dakota (Hughes 1949: 275) and others at a Navajo site in northern New Mexico (Carlson 1965: 24-25).

Except for the burials in baking pits, (which may not be those of Apaches) no skeletons have been found that can be attributed to Dismal River people. Isolated burials at a distance from villages would be in keeping with Apache fear of the dead.

Pottery

Although Dismal River pottery is nondescript, it is diagnostic. The earliest attempt at classification was that by Metcalf (1949) who described three types. The most common, Lovitt Plain and Lovitt Simple Stamped, are distinguished only on the basis of surface treatment and both can be found on a single vessel. Wedel's Scott Plain (Wedel 1959: 592) is apparently indistinguishable from these two types except by its very low incidence of simple stamping. As suggested elsewhere (Gunnerson and Gunnerson 1971), the surface treatment of Apachean pottery in general closely reflects that of their neighbors, and the pottery at Dismal River villages most closely resembles that of the nearest large-village tribe: Mandan, Arikara, Pawnee, or Wichita. Metcalf's third type, Lovitt Mica Tempered, is probably the same as Wedel's (1959: 593) Scott Micaceous. Micaceous sherds are definitely in the minority at Dismal River sites and most are probably trade sherds from northeastern New Mexico of a type called Ocate Micaceous and made by Jicarilla Apaches until c. 1750 (J. Gunnerson 1969b: 26-27).

The only other artifacts of clay are tubular smoking pipes which may have been patterned after the Pueblo "cloud blowers." In fact, one pipe from the Reed site certainly and some of the pipes recovered in Scott County by Wedel (1959: 488) probably were imports from New Mexico.

Stone Artifacts

Most of the stone artifacts found at Dismal River sites, although generally cruder, are much like those found at other protohistoric sites in the plains. Projectile points are mainly small, delicately chipped and triangular, either side-notched or unnotched, with concave to straight bases. Points of miscellaneous shapes and sizes found at Dismal River sites may have been picked up by the Apaches. Well-made knives are rare, but crude cutting tools are common. The latter include large flakes which required very little modification, pieces of tabular chalcedony (where available) upon which a cutting edge had been chipped, or, where there was an abundance of raw material, large crudely chipped bifacial choppers.

End scrapers and side scrapers are common, but rarely was an effort made to finish any part except the scraping edge. Some end scrapers also have

graver points and these are diagnostic of Dismal River. Other combination tools are end scraper-spokeshaves and end-side scrapers. A few flakes were made into gravers or spokeshaves with a minimum of work.

Expanded-base drills, with only the bit portion well worked, are common. Plain-shafted drills are less so. One uncommon but diagnostic Dismal River artifact is the so-called "double bitted drill." These resemble two plain-shafted drills joined base to base, with one, two, or four lugs (projections) near the middle. The function of these is not obvious since they are often made of stone too soft for use in drilling and are often found broken.

The most common ground stone tools are arrow shaft smoothers -- rectangular pieces of sandstone grooved along the long axis on one face and presumably used in pairs.

Metates of two types have been found. Small thin milling slabs, sometimes carefully shaped, with a shallow round to oval depression are the most widespread. Very distinctive specimens, known thus far in the plains only from Scott County, Kansas and Lincoln County, Colorado have been found at two Apache sites in northeastern New Mexico (J. Gunnerson 1969b) and are known ethnographically for the Jicarilla. They are about 30 cm long, two to three times as long as wide, relatively thin, and rectangular with rounded corners and convex sides. The grinding surface is concave along the long axis and slightly convex or flat along the short axis. Manos are the same shape as the metates except for being relatively thicker and considerably smaller.

Bone Artifacts

Awls were usually made from splinters of bone with only the point well finished, but some were triangular or square in cross section and carefully finished all over. Tools similar to the latter, but with a blunt end, have been called flakers or punches. Carefully made and well finished bone projectile points, square in cross section with a basal tang for hafting, and socketed antler projectile points have been found at the Humphrey site in Hooker County, Nebraska. Bison ribs with holes drilled through them presumably were used as wrenches for straightening arrow shafts. Serrated bison metapodial fleshers, a good time marker for the protohistoric period in the Plains, have been found at most Dismal River villages. Often the cluster of foot bones, including the calcaneum, was left attached to form a handle. Antler tine flakers are common; some from the Lovitt site have a flattened area at the top and were apparently handles for end scrapers. Bison scapula hoes or digging tools have been found at most Dismal River villages. All have had the spine removed and some have had the articular end removed also. Others have a groove cut across the lips of the articular surface, presumably to facili-

tate hafting.

In addition to tools, bone was used for aesthetic expression. Tubular beads were made by cutting off the ends of small cylindrical bones. What appear to have been curved arm bands or wrist guards have been found in northern Nebraska and western Kansas. Bone whistles and scored ribs, possibly musical rasps, are the only musical instruments recovered. Paint was apparently applied with spatula-like bone tools and with sections of bones cut so as to expose the cancellous inner portion. Both have been found stained with red pigment.

Trade Items

Ocate Micaceous is the most common trade pottery. All the painted sherds identified from Dismal River sites have been Tewa Red-on-buff or Tewa Polychrome. A few sherds of a type tentatively called Mora Punctated, probably from New Mexico but of uncertain cultural affiliation, have been found at a number of Dismal River sites (J. Gunnerson 1968: 179). Obsidian, a few pieces of turquoise, a few Olivella shell beads and two Pueblo style shaft straighteners probably also came from New Mexico.

Items of European manufacture are rare. An iron trade ax found embedded in the fireplace of a burned house at White Cat Village may have been left there by a Pawnee raiding party. Two gun flints, one apparently homemade, came from the same site. A few scraps of sheet brass or copper, conical sheet metal jinglers, and rusted pieces of iron, some of which may have been awls, have also been found. The nature and amount of European trade material is compatible with the location and dating of the Dismal River aspect, and with the material poverty of its main source of European goods--Spanish New Mexico.

Identification

The identification of the Dismal River aspect with the Plains Apache was established by Champe (1949) and subsequent work has continued to support this position (Gunnerson and Gunnerson 1971, D. Gunnerson 1974). Documentary and cartographic evidence shows Plains Apaches to have occupied the area during the period covered by the Dismal River aspect, and written accounts suggest a culture such as that revealed by the archeology. Also, increasingly, archeological work in northeastern New Mexico (J. Gunnerson 1969b, Gunnerson and Gunnerson 1971) is showing connections and similarities between Apache sites there and Dismal River sites.

Of the various bands of Apaches, the Cuartelejos and Palomas are almost certainly represented by the Dismal River villages thus far excavated. The region of El Cuartelejo included much of what is now western Kansas, far eastern Colorado, and western Neb-

raska south of the Platte River. The Paloma most probably occupied the Dismal River villages farther north in western Nebraska and extended into southwestern South Dakota. The Carlana Apaches, in contact with both the Jicarilla of northeastern New Mexico and the Cuartelejo, were probably responsible for the Dismal River sites in southeastern Colorado.

Semisedentary Apaches seem to have been established in the region called El Cuartelejo by about 1640. At that date Apaches living on the "frontier of Quivira" (Wichita villages) were described as "people of El Cuartelejo" (Hackett 1923-1937 III: 263-264; Forbes 1960: 268) and the term *cuartelejo* was used in the 1600s to refer to an area containing semisedentary, hut-dwelling western Apaches (Tyler and Taylor 1958: 306; Gunnerson and Gunnerson 1971: 11). Escalante, writing in 1778 about an event that probably took place in 1640, and using as his source of information New Mexico lore of his own time, provides an explanation of the origin of the name "El Cuartelejo":

...in the middle of the last century some families of Christian Indians of the nation and pueblo of Taos rebelled, withdrew to the buffalo plains and fortified themselves at a place which afterwards on this account was called El Cuartelejo (Twitchell 1914 II: 268).

Apparently no contemporary detailed account has survived of this flight which probably followed the Taos rebellion of 1640, nor of the return of some of the Taos to New Mexico in about 1662 under orders of Governor Diego Penalosa (Hackett 1923-1937 II: 263-264). Escalante's account has probably done a great deal to lead later writers to think of El Cuartelejo as a place rather than as a region and the presumed main village, in Scott County, Kansas, continues to be called by the same name. None of the datable material, however, is as early as 1640.

Fortunately, there are first-hand descriptions of El Cuartelejo by members of Ulibarri's party which, in 1706, went to the Plains to bring back refugee Picuris and Tewa (mainly Santa Clara) Indians who had fled to the plains in 1696 (Thomas 1935: 59-77). Ulibarri stayed at the main Cuartelejo village, which he named Santo Domingo, but his men visited at least four others, the most remote of which was some 40 leagues (250 km) away. The Picuris living at Santo Domingo occupied "huts or little houses," the Apaches lived in "huts" arranged around a plaza, but Ulibarri did not mention a substantial multiroomed structure. Jose Naranjo, who was with the party, did, however, find "excellent quarters" at another Cuartelejo village called in Apachean "Sanasesli." Fourteen years later Tenorio, another of Ulibarri's men, testified that he had seen in the region of El Cuartelejo "some ruins, which, according to the reports, were made a long time ago by the Taos tribe." He did not, however, say where in the region he saw the ruins, nor even that they were at an

Apache village (Thomas 1935: 158). Another of Ulibarri's men says the Picuris were living in "restored" Taos houses. An account attributed to Escalante by Espinosa, Ulibarri's party is said to have found Picuris living in a restored house or block of houses built originally by Taos Indians (Thomas 1935: 262-264). This statement should be considered with caution since Escalante would have been writing some 70 years after Ulibarri's expedition and he does include some erroneous information. Ulibarri did comment that the land was fertile, the climate good, and various crops were raised. There are apparently no first-hand accounts of visits to Paloma Apache villages which were "on the most remote borderlands of the Apaches" (Thomas 1935: 132).

One line of evidence used initially to support an Apache identification of the Dismal River aspect was the belief that the seven-room pueblo containing mainly Dismal River artifacts in Scott County, Kansas. It was assumed that the structure, being of Pueblo style, had been the one said to have been built by the Taos, or another built by Picuris and Tewa refugees, while they, lived among the Cuartelejo Apaches. Archeology done outside the structure by Wedel (1959: 424-468) yielded artifacts dating only from the late 1600s or early 1700s, compatible with a 1696-1706 occupation by Picuris and Tewa Indians. He found no material indicative of an earlier Taos occupation of the mid 1600s. Witty's (1971a, 1971b) re-excavation of the house block revealed that a pueblo wall had been built over a Dismal River baking pit, and hence that at least part of the Apache occupation was earlier. He also discovered that no previous excavation of the house block had been complete. The Tewa Polychrome sherds Witty recovered inside the house block were identified by Helene Warren of the Museum of New Mexico as dating from 1700-1720, and probably near the end of this period--too late for even the 1696 Picuris refugees to have left them there. Witty also discovered a row of post holes just to the south of the pueblo suggesting a "portal" or porch. Such a feature was apparently not used by Taos, Picuris or Tewa Indians of the period, but was common in Spanish (Mexican) architecture. This new evidence, along with the puzzling scarcity of Pueblo artifacts, even inside the rooms, suggests that the structure may have been built as a Spanish trading post *after* Ulibarri brought back the Picuris in 1706. Construction by Pueblo auxiliaries would account for Pueblo-style fireplaces, corn grinding bins and the Tewa sherds. That such a trading post, although illegal, may have existed in El Cuartelejo is hinted at by several Spanish documents (Thomas 1935: *passim*). This explanation better accounts for all of the evidence than does the one that it was built by seventeenth century Pueblo refugees. There is no doubt concerning the Scott County site's being a Cuartelejo Apache village, however, and it is still the best

candidate for the main village, called by Ulibarri Santo Domingo.

Southern Plains Apache Archeology

Relatively little work has been done in Texas at sites attributable to Apachean groups, although historical sources (Thomas 1935: 82) clearly indicate that Apaches called Faraons by the Spaniards once occupied what is now northwestern Texas. Surface collections in the Panhandle-Plains Museum at Canyon, Texas, suggest that small Apache sites are fairly common in the central part of the Texas Panhandle. At one site near Stinnett, Texas, probable Faraon Apache sherds were found around three rock circles suggestive of structures. Just south of the Panhandle, in Floyd County, Texas, the Southern Plains Archeological Society excavated the Montgomery site (Word 1965) which probably has some bearing on the Apache problem since most of the pottery was of Southwestern origin and some was dated as late as the 1600s. Micaceous pottery recovered might be of Jicarilla manufacture, and Apaches may have been responsible for bringing the later Pueblo (glaze) wares to the area. The majority of the stone and bone artifacts would not be out of place in a Plains Apache assemblage.

Burned rock middens from about 115 km east of Trinidad in southeastern Colorado were reported in Greer (1966). One excavated, the Loudon site (CO-1), consisted of an accumulation of burned rock and ashy soil located on a very slight hill. It was roughly circular with diameters of 5.5 and 9.5 m. A shallow central depression, filled with ash, was 3.5 m in diameter. The outer ring was composed of fire-cracked rock with a maximum height of 34 cm. A cobble hearth about 1.2 m in diameter was found between the central depression and the outer ring. In the middle of the shallow central depression was a basin into bedrock up to 18 cm deep and 2.7 m in diameter. This was partially lined with rock slabs set at an angle to effectively "deepen" the basin. Presumably the basin had been used for pit cooking and the ring resulted from burned rock, ash, etc. being repeatedly cleaned out of the basin. Greer points out that elsewhere such pits are used for preparing mescal and sotol and suggests that cholla (cactus) buds or possibly meat might have been cooked at the Loudon site. Associated artifacts include a small end scraper, a crude bifacial blade, several flakes, a metate fragment, and a mano; unfortunately none is diagnostic. A tipi ring, 4.3 m across and located 11 m from the midden ring, may have been associated. A radiocarbon date (sample TX-290) is 515 ± 65 B.P. or A.D. 1435. A possible Apache authorship is suggested for the site.

Greer (1965) discusses types and distribution of similar manifestations and finds that they occur sporadically throughout the Southwest but are most common in southeast New Mexico and west Texas.

Ethnographically, they are attributed to various Apache bands and numerous other tribes.

On the Chaquagua Plateau in southeast Colorado, the Apishapa focus is followed by sites with earth rings, sometimes surrounded by spaced rocks, suggesting habitations, perhaps the locations of earth banked tipis (Campbell 1976: 62-63). These average about 3.7 m in diameter, which would be a reasonable size for tipis small enough to have been transported by dogs. Cultural material associated with these rings is sparse and consists of a few corner-notched points, leaf-shaped and blade knives, graters, large and small side scrapers, utilized flakes, slab metates and one-hand loaf manos. Chipped stone was almost entirely from local sources with a few flakes of Alibates but no obsidian. Pottery was absent. One of these sites yielded a radiocarbon date of A.D. 1435 ± 65 (Campbell 1976: 26, 64). Except for the presence of corner-notched, instead of triangular unnotched and side-notched points, these sites could represent early Apache occupation on the Chaquagua Plateau, especially if the calendar date is closer to the more recent one-sigma range. By early in the 1500s Apaches would certainly have been in the area since Coronado's party in 1541 encountered them a little farther south where they had apparently arrived 16 years before (D. Gunnerson 1956).

Apache occupation of the 1600s and early 1700s on the Chaquagua Plateau is thought to be represented at 10 sites that yielded thin micaceous pottery. Eight were open and two were rock shelters. Six were located on and the others near level flood plains with arable land. The most common projectile points are small elongate unnotched triangular points, but side-notched triangular points were also popular. Small and large side and end scrapers were found, as were various bifacial blades, utilized flakes and scraper knives. Unifacial metates and ground stone slabs were found so presumably manos were also used. Bones of a wide variety of large and small mammals were recovered. No structures were located for this period. Rings of spaced stones, presumably tipi rings, occur, and are thought to be of more recent historic age although associated artifacts are too meager to identify the rings with any particular complex. Metal points from some indicate a late historic date.

Jicarilla Apache micaceous sherds, both Ocate Micaceous (1600?-1750) and Cimarron Micaceous (1750-1900), have been found at sites along the Upper Purgatoire River west of Trinidad, Colorado, but no structures were associated (C. Wood and Bair 1980). Ocate Micaceous sherds were found in the upper level of Trinchera Cave, and a few thin sherds, similar to Perdido Plain (probably a Faraon Apache ware) were found at a site near Walsenburg. Dismal River-like, sherds were collected from a site on the Apishapa straight west of La Junta. Dismal River pottery has also been found at sites in the canyon of

the Dry Cimarron River south of Kim, Colorado, just barely over the state line into New Mexico (J. Gunnerson field notes). These sites are in territory occupied c. 1700 by Carlana Apache farmers and roamed over until the late 1800s by Jicarillas.

Northeastern New Mexico Apache Archeology

Many of the Apache sites in northeastern New Mexico can be attributed to the Jicarillas, or to groups known originally to the Spaniards under other names who eventually became part of the Jicarillas. Notable exceptions are a few sites provisionally assigned to the Faraon Apaches, who may have been assimilated c. 1800 by the Mescaleros.

The period for which we have the most data on Apache occupation is the late 1600s and early 1700s. Good documentary evidence (Thomas 1935), including references to Apache villages existing along the eastern edge of the Sangre de Cristos in the early 1700s, suggested this area as a logical starting point for Apache archeological studies (D. Gunnerson 1956; J. Gunnerson 1959, 1969b). Also, it was in this area and during this period that the Jicarillas and related Apacheans achieved a cultural climax as semi-horticulturists.

In 1599 Onate was told that Apaches lived in pueblos like those of the Tewas. However, there is as yet no archeological verification of this statement, unless by "pueblo" he meant "community" or "settlement" in general. Our best historical descriptions are those resulting from Ulibarri's journey of 1706 and Valverde's expedition of 1719 (Thomas 1935: 62-64, 110-133, 263). Both expeditions set out from Taos Pueblo, crossed the Sangre de Cristos and reached Apache villages in the foothills near Cimarron, New Mexico. Valverde's account is especially rich and describes small Apache settlements, of from one to eight adobe houses, and irrigated fields. In the mid-1700s pressure from hostile Indians, especially Comanches and Utes, forced these foothills Apaches to abandon their adobe-house villages. The Jicarillas shifted most of their farming activities westward over the mountains into the Rio Grande valley and into canyons between Taos and Picuris. However, they continued to frequent the country east of the mountain crests until they were placed on their reservation in 1887.

The remains of an Apache pueblo (the Glasscock site) about 57 km southwest of Cimarron have been excavated (J. Gunnerson 1969: 24-30). This site is located in the broad sheltered valley of Ocate Creek near its confluence with a major, dependable tributary. Although the elevation is about 2280 m, gardening and farming is currently successful in the area and was almost certainly practical when the site was occupied. Irrigation from the stream would have been easy, and the occupants had ready access to the resources of the mountains on the west and to those of the plains on the east. The only structure

found at the site consisted of seven rectangular rooms, six forming a rectangle, with the seventh, attached to one side, forming an L. The overall dimensions were 7.3 by 9.8 m. Walls about 25 cm thick were made of layers of adobe apparently laid wet, since no evidence of adobe bricks could be detected. There was no evidence of doors or other openings through the walls, but only the wall bases remained. Charred wood and pieces of hard adobe with impressions of logs, probably vigas, were found within the structure. One room contained two partially superposed hearths, both D-shaped and built against an inside wall. A firepit was found in the sheltered area formed by the L of the building. Near the structure was a bell-shaped baking pit of the sort found at Plains Apache and Navajo sites.

The predominant pottery (96 percent) from the Glasscock site is Ocate Micaceous, a very thin hard ware with deep striations on the exterior surface. Thinning was apparently accomplished by using a corn cob both as a paddle and as a scraping tool, which left the striations. The paste contains a great deal of finely divided mica and angular grit, both apparently inclusions in the clay which was very probably taken from deposits near present-day Picuris Pueblo. Decoration is very rare and appendages are absent. The two known complete vessels of Ocate Micaceous, neither from this site, have heights significantly greater than the maximum diameter, rounded to somewhat pointed bottoms, slightly constricted necks, nearly vertical to moderately flaring rims, and simple lips. Association elsewhere with painted Pueblo pottery suggests a time span for Ocate Micaceous from perhaps the late 1500s to about 1750.

Other pottery at the Glasscock site includes Pecos glaze ware and plain Pueblo culinary ware similar to some from Pecos. Fragments of clay pipes, probably all tubular and undecorated, were also recovered. Sherds of blue and white Puebla (Mexico) majolica from the site were dated by E. Boyd as being from the early 1700s with two sherds possibly as late as the 1740s. The combined evidence for dating suggests that the Glasscock site was occupied in the first few decades of the 1700s, during which time, according to Spanish documents, Apaches were living in adobe structures in that general area. And there are no references to Indians other than Apaches living in the area at that time.

The chipped stone artifacts are limited but varied. Projectile points, small, delicate, and well made, are commonly triangular and either side-notched or unnotched. Other chipped stone tools include end scrapers, knives, and small crude "double bitted drills."

Most of the metates found at the Glasscock site are of a distinctive "Jicarilla" type also represented in the Jicarilla museum at Dulce, New Mexico by specimens relinquished only recently by Jicarillas. One complete metate representative of the type is about

30 cm long, 13 cm wide, and 5 cm thick. Such metates are quadrilateral with rounded corners and slightly convex sides and ends. They are distinctive in that the grinding surface is slightly concave along the long axis and straight to slightly convex along the short axis. The manos are similarly shaped, but smaller and relatively thicker. Neither the metates nor manos are well finished on the non-grinding surfaces. The site also yielded shallow basin metates as well as cobble manos that could have been used with them. Other ground stone artifacts included abraders and "Plains type" sandstone arrow shaft smoothers.

Bone artifacts, not numerous at the Glasscock site, consisted of tubular bone beads, awls, eagle wing bone whistles, a probable beamer (for working hide) and antler tine flakers (?).

The Sammis site, of approximately the same age as the Glasscock site but with a very different type of structure, is located about 8 km north of Cimarron, New Mexico (J. Gunnerson 1969: 30-31). The site is on the floor of Ponil Canyon above the reach of floods and about 5 km from the canyon mouth. Nearby farmland could be (and is) irrigated from Ponil Creek, which has permanent water. Elevation is 2000 m and the mountains to the north and west deflect cold winds. To the east of the Cimarron area lie the plains, and to the west are passes to Taos, Picuris, and the Rio Grande valley.

At the Sammis site an ovoid pit about 3 by 3.7 m and 60 cm deep had been surrounded by a ring or low wall of small rocks and roofed over with poles, bark, and probably earth, but no post holes could be found either in or around the pit. The superstructure had probably been conical and braced by the rocks, but no clue as to the nature of the entrance could be detected. Pieces of bark, presumably from the roof, occurred in the fill. There was a shallow basin-shaped hearth near the center of the floor.

The fill of the pit contained both Ocate Micaceous sherds and intrusive Pueblo sherds, presumably derived from nearby Pueblo structures dating from the 1100s or 1200s. Also in the fill was a turquoise bead, a "Plains-type," "snub nosed" end scraper, a drill fragment, and a broken "double bitted drill." From the floor of this pit structure came more Ocate Micaceous sherds, a bone awl, and a sherd of blue and white majolica dating from the early 1700s. The scraper is especially significant since it also had a chipped graver point. No evidence for contemporaneity of the Apache and Pueblo occupations was found during the excavation of all or part of four of the nearby Pueblo structures.

Apache sites of about A.D. 1700 (as well as later) were commonly located on benches or terraces 9 to 30 m above the floor of Ponil Canyon, but within a few hundred meters of the stream. Several of these sites were investigated in both the lower Ponil Canyon (Gunnerson 1969: 32-35) and on the Philmont Scout Ranch in the Upper Ponil Canyon (Glas-

sow, 1980: 76). Structures were amorphous, built on the surface or over shallow depressions, sometimes surrounded by a few rocks, and often showing evidence of having been destroyed by fire. Cultural remains, consisting mainly of Ocate Micaceous sherds and stone chips, are sparse at these sites.

In the mouths of other canyons near Cimarron and on the plains for a few kilometers out from the Sangre de Cristo Mountains are other archeological sites (J. Gunnerson 1959; Schroeder 1959: 8, 33). Some, which could be of Apache authorship, are "tipi ring" sites without pottery, but other cultural material is so sparse that they cannot be dated, even roughly.

The Faraon Apaches were known under a variety of names and by the late 1600s and early 1700s roamed over a large area from the Sandia Mountains east well into the plains. Their villages, some with mud-plastered wood (jacal?) houses, were reported to the Spaniards in 1715 (Thomas 1935: 24, 82). Precise locations were not given, but they were probably on the Canadian River in the panhandle of Texas, where probable Faraon sites have been found in the Palo Duro near Canyon and on the Canadian near Stinnett. These sites yield pottery similar to that from a large "tipi-ring" site on the plains about 50 km northeast of Las Vegas, New Mexico. This site, Ojo Perdido (Gunnerson and Gunnerson 1970: 3; 1971: 10), is unusual because of the large number of tipi rings (well over 200) and because pottery, although not abundant, is associated with many of the rings. The dominant pottery, Perdido Plain, is a thin undecorated ware that resembles a Pecos Plain ware of the 1600s and 1700s, although it is thinner. Associated glaze sherds from both Pecos and Picuris suggest a date in the mid-1600s for the site. Excavation in and around rings failed to reveal any subsurface evidence of occupation, not even evidence of hearths, but the site may have been deflated.

The function of the Ojo Perdido site is uncertain, although the presence of what had been a good spring was an obvious attraction. The paucity of cultural remains suggests temporary occupation or occupations. The most plausible explanation is that the place frequently served as a camp, perhaps only overnight, for Faraon Apaches are known to have traveled often between the plains and the pueblos of Pecos and Picuris, especially the former.

Pecos Pueblo was frequented not only by the Faraons, but also, especially in the mid-1700s, by allied Carlanas, Palomas, and Cuarteles, as well as Jicarilla Apache groups. In some instances Apache visitors lived at (even in) the pueblo for periods up to several months (Thomas 1940: 124). Reconnaissance in the immediate vicinity of Pecos Pueblo disclosed several areas that may have been occupied by Apaches (Gunnerson and Gunnerson 1970). A burned pole and earth structure was excavated that had been about 3.7 m in diameter and built on the

surface of the ground or over a very shallow pit. Associated items were a small Ocate Micaceous pot, a plain black Pueblo olla, and a Pueblo red ware bowl, all crushed when the house fell in. Also on the floor were burned corn, burned beans, a tubular clay smoking pipe (Pecos style), a copper cone, triangular stone projectile points, the tip of what had probably been an iron awl and scraps of iron and brass. Of special interest was a sherd of blue and white Chinese porcelain probably dating, according to E. Boyd, from the mid-1600s. A similar date is suggested by the Pueblo vessels associated with the structure.

In summary, then, starting at about A.D. 1550, evidently soon after Apacheans appeared in the Southwest, the life-way of those settling in northeastern New Mexico began to change. They arrived as nomadic hunters, but eventually, probably gradually, adopted horticulture, semipermanent villages and pottery making. The association of Ocate Micaceous at a site on the North Ponil with a section of a Sankawi Black-on-cream bowl (Glassow 1980: 76), a type that was "developing by 1550" (Lang 1982: 183), suggests that Ocate Micaceous might have been made by the mid- or late 1500s. Other Pueblo trade sherds date from the early 1600s. A pre-1600 date for Apache pottery is not unreasonable, since in 1599 Onate (Hammond and Rey 1953: 245, 484) described some Apaches as "pueblo" dwellers, indicating at least semipermanent settlements. Other Apache sites yielding Ocate Micaceous and Perdido Plain pottery have been dated between about 1650 and 1750. These sites include a wide variety of structures: a multiroom adobe house, a rock-ringed pit structure, surface structures with brush roofs and walls (with or without encircling rocks), and "tipi rings." Settlements consisted of scattered camps and farmsteads, the latter situated near good irrigable farmland in the mouths of canyons. The resources of both the plains and the mountains could be exploited from such bases and hunting may have continued to be the main subsistence activity. The artifact inventory, especially items related to hunting, strongly resembles that of the Plains (Dismal River) Apaches (J. Gunnerson 1960; 1968). Included are the diagnostic "double bitted drills" and combination end scrapers-gravers. The "foothills" Apaches of the Sangre de Cristos possessed distinctive metates and manos also found archeologically at Apache sites in western Kansas and used until recent times by modern Jicarillas. Contact at c. 1700 with the Pueblos, especially Tewas, is indicated by the presence of Pueblo pottery at most sites. Limited amounts of Mexican majolica, Chinese porcelain, and metal attest to contacts with the Spaniards. The interaction of northeastern New Mexico Apaches with other Indians of the Plains and Southwest and with the Spaniards is also substantiated by the historical sources. During the second quarter of the 1700s,

mounting pressure from other Indians, especially Comanches and southern Utes, made it useless for Apaches to attempt to maintain adobe villages, but they apparently continued to tend crops from less permanent structures, and certainly continued to live in the area or visit it frequently.

Edwards Complex

This complex, located in west-central Oklahoma just beyond the southeastern corner of the Central High Plains, may prove to be critical to an understanding of the Late Ceramic (Protohistoric) period of the Central and Southern Plains. At least three sites have been assigned to the complex but thus far it is represented in the literature almost entirely by the detailed description (Baugh 1982) of surface collections from the type site, Edwards I (34 BK 2). A date of A.D. 1550-1650 has been suggested for the complex. Except for the paucity, even the absence, of European trade goods in the Edwards complex, it is apparently nearly identical to the Wheeler Complex which is dated at A.D. 1650-1750 and includes limited amounts of trade goods. Baugh sees the Edwards Complex as essentially a continuation of the Washita River Phase except for differences in the pottery.

The most distinctive part of the Edwards inventory is the pottery, most of which closely resembles either Lovitt Plain or Perdido Plain, both types attributed to Plains Apaches. Also attributed to the complex is Little Deer ware, both plain and decorated, that is associated with the Wheeler complex and resembles Lindsay Plain, a Washita River Phase type, from which it may have evolved. Trade pottery of several southwestern and southeastern types provides the main basis for dating the Edwards complex as protohistoric; the paucity of European trade material is the basis for suggesting a pre-1650 date.

Baugh (1982: 186) summarizes the lithic and bone assemblage of the Edwards complex as follows:

Lithic artifacts attest to a continuation from the Washita River phase with only minor changes. Unnotched triangular points (Fresno) are the most common form followed by side-notched and/or basally-notched points (Washita, Harrell, and Garza respectively). Other implements which increase in frequency include end scrapers, ensiform shaped pipe drills, and reamers. A greater variety of flake knives, scrapers, adzes, and expanding base drills may also be associated with the Edwards complex. Agatized dolomites from the Texas panhandle (Alibates and Tecovas) continue to be the predominate lithic material in use but the quantities of Edwards and Kay County chert as well as obsidian increase substantially.

The most distinctive bone implement is the

serrated flesher. Bison scapula hoes may have continued into this period although in somewhat fewer numbers (Hofman 1979).

None of these artifacts is truly diagnostic of the Washita River Phase and all can be found in various other late prehistoric and/or protohistoric complexes of the Central and Southern Plains. There is a strong possibility for confusion as to what does comprise the Edwards complex, since at the type site there apparently was also a Washita River Phase component. There also appears to be a substantial Apache representation at the Edwards I site. Extensive interaction with Pueblo peoples, especially of the Upper Rio Grande, and peoples to the southeast is indicated by a wide variety of trade pottery.

One very interesting feature of the type site (34 Bk 2) is an encircling trench that can only be interpreted as defensive, and one other Edwards complex site had apparently been fortified. At Edwards I, the main concentration of detritus was apparently outside the area enclosed by the ditch. The site is also interesting in that it is unusually large and multicomponent, which can be explained by the presence of good sweet springs there and salt springs not far away. The wide variety of trade pottery, from both the Southeast and the Southwest, suggests the possibility that Edwards I was an important trading/rendezvous site. The publication of the results of the excavations there by the University of Oklahoma should help clarify the function(s) and affiliation(s) of this site and should make possible the definition of the Edwards Complex; as mentioned before, the Edwards complex is now defined primarily on the basis of surface material from this multicomponent site.

The ethnic affiliation of the Edwards complex presents an interesting problem. The similarity of the majority of the ceramics to pottery identified elsewhere as Apache supports such an identification for the complex. Baugh (1982: 217) favors an identification of Edwards with the "Teya", whom he considers ancestral to the Wichita, although a better case can be made for the Teya to have been Apache. Hofman (1978b), on the other hand, feels that the Wheeler complex, which is almost identical to the Edwards complex except for having more European trade material, is *not* protohistoric Wichita. The rest of the artifact assemblages would not be out of place as either Apache or Wichita.

Wheeler Complex

This complex has been defined primarily on the basis of surface collections from the Little Deer site (34 CU 10), located just beyond the southeastern corner of the Central High Plains (Hofman 1978b). The complex has been dated at A.D. 1650 to 1725 or 1750. It is apparently a continuation of the Edwards complex which is located in the same area and is dated at 1550-1650 (Baugh 1982). The two com-

plexes appear to be essentially identical except that Wheeler has a small amount of European trade goods while the Edwards complex apparently has none. Also, Wheeler has a higher percentage of unnotched projectile points and a lower percentage of Alibates dolomite than does Edwards. Like the type site for the Edwards complex, Little Deer was multicomponent and contained evidence of a light use in the Archaic and a modest Custer or Washita River Phase occupation. This makes the precise definition of the Wheeler complex impossible. The artifact assemblages of the Edwards and Wheeler complexes are apparently much alike and differ little from that of Washita River except for the addition of toothed bone fleshers and, in the case of Wheeler, the presence of limited European material.

One interpretation of the Edwards and Wheeler complexes was that they represented a development out of the Washita River phase with a possible admixture from the Panhandle aspect. At one time it was thought that the Wheeler complex at the Little Deer site represented a Wichita occupation, an idea that Hofman (1978b) rejected, apparently because of differences between it and material found at the Deer Creek site which is a little later and well documented as Wichita. A possible Apache affiliation was suggested for the Little Deer site. Baugh (1982: 217), as mentioned before, favors a Teya identification for the Edwards complex and considers the Teya as ancestral to the Wichita. By extension, this would again suggest a Wichita or ancestral Wichita identification for the Wheeler complex. If the Tewa were Apaches, as seems more likely, the Edwards and Wheeler complexes could have Apache affiliation.

CHAPTER SIX

THE HISTORIC PERIOD

The division between the Protohistoric and the Historic periods in the plains is somewhat arbitrary. The first European contact with plains Indians for which we have written reports was that of the Coronado party in 1540-1542 (Hammond and Rey 1940; Winship 1896). The information from this expedition, a temporally isolated penetration of the Pueblo area and the Central Plains not to be equalled for sixty years, until Onate's entrada of 1598-1601, is useful in the interpretation of archeological manifestations and in the reconstruction of culture history. However, identifications of plains groups mentioned are interpretations in themselves. Not until about 1700 was enough information recorded so that one can be certain of the identification of some specific archeological sites with settlements described in the documents, and not until the mid-to late-1700s did enough information become available for the identification of other sites. Many later sites, especially the less substantial, mentioned in written records may never be located and identified with certainty. This is as true for sites attributable to occupations or events involving Europeans as for those related to Indians. Although the Historic period begins earlier in certain other sections of the United States, for the Central High Plains a date of ca. 1750 is reasonable. In the northern portion of this region, few of the known historic sites related to Indian activities have been investigated archeologically. Furthermore, we are not apt to find many such sites, for we can be reasonably certain, on the basis of historical documents, that there were no permanent villages in the area, and the temporary camps would not normally yield material diagnostic of particular groups.

Pawnee

For the Central High Plains, the Pawnee and their ancestors form a base line for chronology and a standard for comparison. During the protohistoric period the Pawnee, along with their close linguistic relatives, the Wichita to the south, provided a strong and stable bloc immediately to the east of the Central High Plains. In late protohistoric times the Wichita abandoned their homeland in central Kansas under pressure from Siouans, but the Pawnee continued to occupy permanent villages in east-central and south-central Nebraska and north-central Kansas. Their perimeters, however, were constricting

before 1876, when they were moved to their reservation in Oklahoma. Pawnee archeology and history have been dealt with by Wedel (1936, 1938, 1956, 1959, 1961), Strong (1935), Witty (1967), Weltfish (1965), Grange (1968), and Hyde (1934a,b, 1951), to cite but a few authors.

The northeastern part of the Central High Plains was part of the Pawnee hunting territory, and within it one can expect to find their camps. If no pottery was left at these sites, however, it would be difficult to identify them as Pawnee. No historic Pawnee village existed as far west as the eastern edge of the Central High Plains.

The Carmody Site

The Carmody site (25 HK 7), located in Hitchcock County, extreme southwestern Nebraska, has two Woodland occupations and one attributed to Pawnee of ca. 1750 (Kivett 1952: 27-28; Grange 1968: 20). Although the site is near Massacre Canyon, where a crucial battle took place between some Sioux and Pawnee in 1873, the Pawnee component at the Carmody site is not related to the massacre and can best be interpreted as a hunting camp. The only artifacts from the site attributable to the Pawnee are 23 sherds, most of which were surface finds. However, one sherd appeared to be associated with a simple hearth and two were excavated. A few Pawnee sherds have also been found in the extreme northeast corner of Colorado (S. Sigstad, personal communication). For a much more complete description of Pawnee (and Lower Loup) pottery, see Grange (1968).

There is apparently a historic component at site 14 PA 301, at the edge of Larned, Kansas (Monger 1974), which in 1839 was identified by a traveler, Matthew C. Field, as a Pawnee hunting camp of the year before. The house remains described by Field, however, sound far less substantial than Pawnee earth lodges, and this historic component at the site has apparently never been isolated archeologically. The same site has yielded nineteenth century pueblo pottery, identified as Acoma and "Rio Grande," but since the site was a favorite camping place on the Santa Fe Trail, the chances are very good that the Pueblo pottery was carried by people using the trail. In any case, the presence of historic Pawnee sherds far from their villages at what appear to be hunting camps gives hope that additional hunting camps, if

found, can be identified on the basis of ceramics.

Cheyenne

One of the best documented Cheyenne sites investigated archeologically is in southeast Ness County, Kansas, on the south side of the Pawnee River (Creek), 52 km west of Fort Larned (Miller 1977: 82; Millbrook 1973; Earl Monger, personal communication). Here, in 1867, General Winfield S. Hancock, burned a large Cheyenne tipi village which the Indians had hastily abandoned, leaving most of their possessions behind. Limited excavation in a field thought to be the site of the Cheyenne village uncovered great amounts of burned material. Additional excavation would probably be rewarding even though much material was apparently salvaged after the destruction of the camp.

J. Wood (1967: 648) suggests that the most recent component, represented by tipi rings, at the Hatch site (5 WL 38) in Weld County, northeastern Colorado, may be Cheyenne or Arapaho, primarily because of a radiocarbon date of 160 B.P. (sample GXO-562).

Historic Jicarilla Apache Archeology

Thus far, no sites dated in the late 1700s or early 1800s and attributable to the Jicarillas have been thoroughly investigated. By about 1750, Jicarillas had moved to the Rio Grande valley and settled mainly near Ranchos de Taos, where they were reported in the mid-1700s by Bishop Tamaron (Adams 1953: 215) and others (D. Gunnerson 1974: 216-222, 238-239). In this area, now badly eroded, are a number of sites yielding Cimarron Micaceous (J. Gunnerson 1969), a pottery thicker than the earlier Ocate Micaceous. Jicarilla pottery in various museums, made and collected ethnographically in the late 1800s and early 1900s, could probably also be assigned to Cimarron Micaceous. Since the mid-1800s there developed a marked resemblance in the pottery of the Taos, Picuris and Jicarilla, all of whom used micaceous clay from the same or neighboring deposits and influenced one another's ceramics extensively. The outer and usually the surface of the pottery of all these groups still shows striations from smoothing with corn cobs, and encircling fillets on the rims are common. One diagnostic trait of Cimarron Micaceous is a marked thickening or splaying of the flattened lip of many ollas such as is found on some Plains (Dismal River) Apache pottery (J. Gunnerson 1960: 164) of about 1675-1725. Since the Jicarillas were first joined by some of the Dismal River people about 1730 (Adams 1953: 223-224; D. Gunnerson 1974: 212, 281-282, 290), and rejoined by these same groups (as the Llanero Band of the Jicarilla ca. 1798), these Plains Apaches could have introduced the flattened and thus thickened lip as a Jicarilla ceramic trait.

Reconnaissance along the Rio Grande in the Velarde-Pilar area has revealed sites that can be attributed to the Jicarillas of post 1750 (J. Gunnerson 1964 field notes). Again, historical documents summarized by D. Gunnerson (1974: 240-246) had indicated that there should be sites dating from the 1760s in this vicinity. The sites located through survey are situated on high benches along the river as if they had been selected with concealment or defense in mind. One of the largest, however, is on a low flat near a good spring. Apache sites, probably camp sites of visiting Jicarillas, have also been found near Picuris Pueblo (J. Gunnerson 1969: 35-36).

Jicarillas were still living and hunting in the Cimarron area during the mid- and late-1800s (Keleher 1964: 45-64) and their sites of this period can be identified by the presence of Cimarron Micaceous pottery. Two such sites have been excavated. At one of these, the Chase Bench site (J. Gunnerson 1969: 32-35), a vantage point which also had an earlier Apache occupation (*supra*), there were seven rock rings 3.7 to 5.5 m in diameter. In the middle of each ring was a burned area or hearth. In addition to sherds of Cimarron Micaceous, the site yielded a little evidence of stone flaking and moderate amounts of metal and glass. Metal items include barrel hoop fragments (one made into a serrated fleshing tool blade), a spoon, parts of a harmonica, square nails, a conical jingle, and what was probably a tin can lid. The glass included bottle fragments and small beads. The Clinging Cactus site (Kuhman 1968), located about 1.6 km north of Cimarron, yielded Cimarron Micaceous sherds, a glass bead, metal and glass fragments, and a U.S. military button that was too badly deteriorated for exact dating. A burned area and a possible use surface were the only indications of a structure.

Surface reconnaissance has located various other sites with similar artifact inventories along the eastern foothills of the Sangre de Cristos from near Raton south to about Anton Chico. In some cases it is difficult to distinguish Jicarilla sites from those of Spanish Americans, since the Jicarillas deliberately camped near Spanish villages and the Hispanos traded for Jicarilla pots. At many of these Jicarilla and/or Spanish American sites of the 1800s, there are sherds of polished Tewa red and/or black pottery.

The John Alden site (Gunnerson 1979: 168), *a.c.* 1850 Jicarilla Apache community, is located on a mesa east of San Miguel and north of Villanueva, New Mexico; within sight to the east is Starvation Peak. The north edge of the mesa drops steeply and overlooks the old Santa Fe trail. Five crude dry-laid rock structures were excavated out of a hundred reported to be on this 40 km² mesa top. Walls about 1 m high, to judge by the amount of fallen rock, had been laid around slight depressions. Most structures tended to be round, about 3 m in diameter, with evidence of a hearth in the middle. One ap-

peared to have had three small irregular rooms. The best preserved structure was L-shaped, with the main portion 0.9 by 2.7 m and the extension 0.6 by 0.9 m. A Spanish-style corner fireplace was near the entrance at the top of the L. Trash was sparse, suggesting a brief occupation. The dominant pottery from the site, a previously unreported type, is undecorated and tempered with crushed micaceous schist. It is like Cimarron Micaceous except that it is not made from the micaceous clay characteristic of the latter. Associated with this pottery were a number of sherds of Powhoge Polychrome from Nambe Pueblo and dated at 1760-1850 (Harlow 1970: 8). Also of interest for dating is a U.S. Dragoon uniform button, of a type made only from 1840 until 1849, that probably did not arrive in New Mexico before 1846, when the U.S. Army took over. Thus a date of close to 1850 is indicated for the site.

Stone artifacts and animal bones were present but not common. Other items of European or American manufacture included a fine-tooth-comb of bone, fragments of yellow and white English china, also representing a ca. 1850 date, a steel arrowhead, part of an iron spoon, scraps of metal and two other less easily datable buttons.

Considering (1) the presence of a majority were closely resembling Jicarilla Apache pottery found elsewhere, (2) the presence of trade pottery from Nambe, a pueblo with which the Jicarillas had much contact (Bandelier 1890: 261), (3) the ca. 1850 date, and (4) the site's location near the town of San Miguel, there is little doubt that it can be attributed to the Jicarilla band that James C. Calhoun (Abel 1915: 350) said was in that specific area in 1851 under the leadership of Chief Chacon. Also, no other Indian groups were mentioned in Calhoun's detailed reports as being near San Miguel at that time.

Thus, although gaps remain in the Jicarilla archaeological record, excavations reported represent a sampling of the historical continuum from as early as perhaps 1550 to at least 1887, when the Jicarillas were moved to their present reservation. The year 1887 did not mark the end of Jicarilla use of northeastern New Mexico, however, for a group left the reservation at Dulce and lived briefly in the general vicinity of Mora, New Mexico (Russell 1898). Hunting parties continued to visit the Cimarron area until well after 1900.

CHAPTER SEVEN

CULTURAL SUMMARY OF THE HIGH PLAINS

The following summary looks at cultural developments within ten subareas of the Central High Plains. At no time was any one of these subareas completely isolated from its neighbors so the boundaries are somewhat arbitrary. Each of the subareas, however, does have a separate cultural identity, especially during the Middle Ceramic period when there was the greatest cultural diversity and intensity in the Central High Plains. The subareas also tend to have environmental differences which have helped shape political and cultural disparity, even to the establishing of some of the modern state lines. Defining the subareas in terms of state lines is convenient for quick reference and also reflects the fact that much of the archeological work has been done by institutions who have at least implicit obligations to their own states. This provincialism has led to the possibility that manifestations of the same complex in adjoining states may have been assigned to different phases. More serious, it has led to distortions in descriptions of areal distribution of complexes in that the amount of field work done in adjoining states or even different parts of the same state varies widely. Since the perimeters of the area here called the Central High Plains were rather arbitrarily drawn, several of the complexes mentioned in this work are represented only by peripheral sites, which can best be understood by drawing on information from their core areas published elsewhere.

Within the Central High Plains we see on the Paleoindian and Archaic levels as much cultural diversity as one could find in any other area of comparable size in North America. Even so, the Clovis, Folsom and Firstview complexes have distributions covering the entire area. Starting with Late Paleoindian, there is a pattern of ever-increasing diversity with more and more local complexes emerging until a maximum is reached at the end of the Middle Ceramic period. Before most of the Late Ceramic period complexes were really well established, indigenous cultural developments were truncated by European exploration and settlement, first indirectly and later directly. In spite of the diversity mentioned above, there is a basic cultural unity throughout the entire Central High Plains except for the southwest corner where there was a strong Pueblo influence during the Middle Ceramic Period, which was a period of culture climax in both the plains and Southwest. The Pueblo influence, although not conspicuous, was probably also basic to some of the

marked changes that distinguish the Middle from the Early Ceramic complexes throughout the Central High Plains. Even though much of the Central and Southern Plains was apparently dominated by Caddoan-speaking peoples from at least Archaic times onward, significant cultural changes marked the beginning of each of the Periods.

For the most part, the summaries of the ten subareas of the Central High Plains are not documented since each is described in greater detail elsewhere in this volume. The order in which the summaries are presented is generally northeast to southwest with an attempt to have each subarea followed by the neighbor with which it has the most similarities. Since we are dealing with two-dimensional data in a one-dimension presentation, this arrangement is not completely satisfactory. For example, northeastern Colorado has much in common with southwestern Nebraska, but the two summaries are separated. Within the summary for each subarea, the arrangement is chronological.

SOUTHWESTERN NEBRASKA

This 30,000 square kilometer subarea, forming the northeast corner of the Central High Plains, is bounded on the south and west by Kansas and Colorado, respectively; on the north essentially by the Platte River; and on the east by a north-south line through Kearney, Nebraska. The rolling short-grass plains are drained primarily by the Republican River and its tributaries, along which were modest stands of deciduous trees in the bottom-lands. There has been more archeological work done here than in any other part of the Central High Plains of comparable size. Even so, information is not even with regard to quantity or quality, and additional work needs to be done. Much of the additional work, however, should consist of the analysis and publishing of unreported field work done in the past.

Localities explored in Southwestern Nebraska have been determined largely by need for salvage behind dams constructed in the Republican drainage in the 1940s and 1950s rather than chosen as a result of problem-oriented planning. An earlier survey carried out in the Republican drainage in the 1930s by the Nebraska State Historical Society, while productive, reflected to a large extent the interests of A.T. Hill, the Society's Museum Director.

The differences in the number of sites excavated

in the various localities probably also reflects real differences in the number of large or conspicuous sites, all of which are related to horticulture. The eastern edge of the area, the 99th meridian, is essentially the eastern border of the High Plains and the western limits of dependable dry farming. The limiting factor is rainfall, especially effective precipitation, and this has fluctuated markedly during the Holocene. There have apparently been shifts in rainfall patterns throughout the plains that would either favor or preclude horticulture in particular sections of this marginal area.

Paleoindian sites dating from essentially the full time range can be expected in Southwest Nebraska, even though few have been excavated. Probable pre-Clovis occupation has been reported from two sites near Wray, just over the boundary in Colorado, and there is no obvious reason why such sites should not be found farther east. A major problem will be the detection of human activity at such sites, since inconspicuous expediency bone tools were commonly used in butchering and, although stone tools were probably also used, no diagnostic stone artifacts have been identified as part of the complex. Any concentrations of late Pleistocene faunal remains should be carefully scrutinized for subtle evidence of human activity.

Clovis (Llano) complex sites can also be expected, since distinctive fluted Clovis points are known from chance finds. The remains of mammoths, which were common prey for Clovis hunters, have been found widely scattered over Nebraska. Thus any mammoth remains found should be carefully examined for evidence of human activity, or artifacts, especially if the bones are found in a context suggesting boggy conditions or shallow lakes at the time the bones were deposited or if the bones appear to have been stacked in some orderly manner. Of special importance would be the locating and excavation of Clovis camp sites, since our knowledge of the culture of Clovis people thus far comes almost entirely from kill and butchering sites.

Apparently evolving from Clovis was the Folsom complex that immediately succeeded it. The fluted points diagnostic of Folsom are much more finely chipped than Clovis points. Unfluted specimens called Midland points, which otherwise closely resemble Folsom points, are commonly found in association with Folsom and may represent the same complex. At kill and butchering sites, these points are found with the remains of bison *antiquus*, an extinct species that was considerably larger than modern bison. No site with a Folsom component has been professionally excavated in southwest Nebraska, but the presence of Folsom is documented by chance finds of points, and Folsom sites have been excavated to both the south and west. Although the complex is named for a kill site near the town of Folsom in northeastern New Mexico, the most information comes from the Lindenmeier site near the

foothills of northern Colorado, where both a living area and a kill/butchering area were excavated. Here the artifact inventory, including scrapers, cutting tools and ornaments, was much more complete. It would be highly desirable to find and excavate another occupation/camp site to provide an even broader basis for the description of the complex.

For some three millennia following Folsom times, we have on the Plains several cultural complexes such as the Cody, Agate Basin, Kersey, Hell Gap, Firstview and Fredrick complexes that are probably all represented in Southwestern Nebraska. Each has diagnostic spear or dart points with some types grading into one another. The points all tend to be lanceolate and unnotched, but some have shoulders. Chipping is frequently excellent and very well controlled. At the end of the late Paleoindian period there is a marked decline in the craftsmanship as seen, for example, in the points of the Frontier complex. Other artifacts include end and side scrapers and cutting tools of several forms. Projectile points were often reused as cutting or butchering tools and repeated sharpening markedly changed their outline.

Bison continued to be the predominant animal hunted: species range from the large, extinct, bison *antiquus* into modern bison *bison*. Remains of various other animals are found. Sites tend to be located along streams and are sometimes buried under substantial alluvial and/or aeolian deposits. Occasionally evidence such as post holes, apparently representing simple structures, is found. Within these late Paleoindian complexes there appear to be regional variations that meet in the western Kansas/eastern Colorado/southwestern Nebraska area.

The Archaic period in Southwestern Nebraska is perhaps the most poorly known, although sites are probably numerous. Archaic complexes are non-ceramic and only modern species of animals are present in the faunal remains. The most common diagnostic artifacts are large, notched dart or spear points of several types; however, some of the points are as small as some arrow points. Many of the Archaic point types continue into the Early Ceramic or Woodland period. Less common, but perhaps more diagnostic, are atlatl (spear thrower) weights commonly called "boat stones" because of their general resemblance to canoes; these, too, continue into the Early Ceramic period. Ground stone artifacts, such as milling slabs and hand stones, are more common in the Archaic period than before and continue into later periods. Archaic complexes in Southwestern Nebraska have their closest affiliations with complexes to the east and southeast. However, these complexes extend west essentially to the foothills of the Rocky Mountains, where they apparently meet other complexes that have affiliations to the southwest, west, and northwest. Subsistence was based on hunting and gathering, but people apparently utilized a much broader spectrum of resources than did the Paleoindians. This latter distinction may be more

apparent than real, reflecting more complete and better preserved samples.

The Early Ceramic complexes of Southwestern Nebraska apparently evolved out of indigenous Archaic complexes with the introduction, from farther east, of pottery making, and possibly horticulture. For nearly a millenium this way of life did not change significantly. Then, about a thousand years ago, the Early Ceramic complexes evolved, apparently in situ, into Middle Ceramic complexes with the introduction of new traits, probably from the Pueblo Southwest. A diligent search should be made for sites dating from the transitional periods at the beginning and end of the Early Ceramic period in an attempt to test this postulated version of High Plains culture process.

The Early Ceramic period in southwestern Nebraska is known from several excavations there. The hallmark of complexes of this period is the thick, cord-roughened, tall, pointed-bottom pottery vessels showing marked similarities to Woodland pottery found throughout most of the eastern United States, where it is usually associated with evidence of incipient horticulture. The artifact assemblage is essentially a continuation of that of the Late Archaic period, with the addition of pottery and small stemmed or corner notched projectile points that probably tipped arrows propelled by a bow. Structures are represented by irregular shallow pits that had apparently been roofed over with perishable material; storage pits are also found. Burial practices, more elaborate than in earlier periods, involve both primary and ossuary interment. Bodies are often accompanied by shell ornaments and beads, sometimes in great numbers. There is no question about the eastern Woodland influence in early ceramic complexes in most of Southeastern Nebraska, but by the time one reaches the western boundary of the state the complexes are so attenuated that calling them "Woodland" is perhaps not justified. Subsistence continued to be based primarily on gathering and hunting, especially of animals smaller than bison, and there could have been modest attempts at plant cultivation. Some of the sites show prolonged occupation, probably year around, but there is little direct evidence of horticulture. The most common location for villages is on low terraces along small, permanent streams, although ridges were also utilized, especially for burials. Occupation levels, especially on low terraces, are frequently buried a few centimeters to a meter or so under alluvium and sometimes also under aeolian deposits dating from subsequent drought periods.

What is here called the Middle Ceramic Period is included by some authors in the Late Ceramic Period, a designation here reserved for what is also called Protohistoric. Sites of the Ceramic period in Southwestern Nebraska belong to the Upper Republican Aspect, a western manifestation of the Plains Village pattern which, with regional variations, is

found in the eastern halves of South Dakota, Nebraska, and Kansas, in western Oklahoma and in the Texas Panhandle. In Nebraska, complexes of this pattern are commonly assigned to the Central Plains tradition to distinguish them from the Middle Missouri tradition to the north.

Upper Republican villages or hamlets are characterized by one to a few earthlodges which, for the most part, conform to a common pattern. Square to rectangular pits, sometimes with two or four rounded corners, were excavated 30 to 60 cm into the ground and were up to about 15 m across. A ramped entrance extended for a few meters from the middle of one side, usually to the south or to the east, or down hill, or away from the prevailing wind. In the middle of the floor, which was not specially prepared, was a simple pit that served as a hearth. About midway between the hearth and each of the four corners was set a substantial roof support post. Around the perimeter of the floor were smaller, more closely spaced support posts which also flanked the entrance ramp. The whole structure was covered with poles, grass, and earth, leaving a central smoke hole. Storage or cache pits are commonly found both inside and outside the structures. Villages are located on high terraces or ridges near bottom land easy to farm. Both primary burials and secondary (ossuary) burials are found, often on even higher terraces or ridges.

Upper Republican pottery vessels were cord roughened with some smoothing, and globular with a constricted neck. A significant proportion of the rims were thickened (braced) and commonly decorated with incised or cord impressed lines forming simple geometric patterns. Projectile points are predominantly small, delicate and triangular with no notches, or with side notches, or with side notches and a basal notch. The bow and arrow apparently had completely replaced the atlatl and dart. Other chipped stone artifacts include various forms of knives, including the alternately beveled diamond shaped variety, numerous well made end and side scrapers, drills with expanding bases, graters and spokeshaves. Common bone artifacts include bison scapula hoes, shaft wrenches, awls of various forms, and tubular beads. A rare but culturally significant antler artifact is a broad, thin bracelet or bow guard decorated with an incised hand-and-eye motif distinctive of the Southern Death Cult. Other Death Cult traits include copper ear spools, bird effigy stone pipes, worked human bone and possibly cannibalism.

Subsistence was based on a combination of corn-bean-squash horticulture plus hunting a great variety of animals, fishing, and gathering. It seems likely that much of the cultural florescence in the plains during this period, as in the Southwest, reflects the introduction, via Mesoamerica, of a new kind of low-row-number maize which gave good yields and was easily milled. The idea of globular

pottery vessels and earth-covered pit structures probably also entered the plains from the Southwest at this time. Surface manipulation as a technique of pottery decoration more likely entered the plains from the east, and certain ceremonial traits are an expression of the Death Cult of the Southeast. Other ceremonial traits that are known ethnographically and appear to have come from the Southwest may also have entered the plains at this time, but without leaving any conspicuous archeological evidence.

The end of the Middle Ceramic period on the high plains was marked by extensive and substantial population displacement, apparently brought about by worsening climatic conditions--droughts disastrous for horticulture in this marginal environment. At least some of the people from southwestern Nebraska moved to the northeast and some may have moved south before moving east.

An interesting climatological/archeological picture is emerging for the Middle Ceramic period. There appear to be marked shifts of population centers-of-gravity in the Central High Plains in response to changes in the patterns of precipitation postulated by Reid Bryson and coworkers. But instead of a model of major migrations, as has been suggested before, a pattern of fusion and fission with rather fluid boundaries between social groups, such as bands, would probably be closer to reality. This would also have been accompanied by changes in utilization of large areas, for example, a shift from emphasis on horticulture to hunting, as climate and centers of gravity of populations changed. Areas would have been used more or less intensively, rather than being abandoned, until about A.D. 1400 when severe drought apparently forced virtually complete abandonment of the Central High Plains west of the 99th meridian. There is obviously a need for locating and testing a large sample of Middle Ceramic sites and for the development of dating techniques as precise as dendrochronology to test and refine this "fusion and fission" model.

The late Ceramic Period, also called the Protohistoric, started at about the time of first Spanish contact with the plains in 1541 and lasted until about 1775 when enemy pressures and disease, brought about primarily by western movement of the frontier of European settlement, led to cultural disintegration. Indian tribes from farther east were pushed into the plains ahead of actual white settlement and tribes from the Great Basin, once they acquired horses, moved onto the plains to hunt buffalo. Just before the Late Ceramic period, Athabascan speaking hunters moved south along the plains as the region was recovering from the severe drought that had essentially depopulated it, and before the former inhabitants returned. During the 1500s, 1600s and early 1700s the tall-grass prairie area immediately to the east and northeast of Southwestern Nebraska saw a return to lifeways not too unlike those of the Middle Ceramic period, with the

development of the Lower Loup (protohistoric Pawnee) complex. Subsistence still depended on a combination of hunting, gathering and horticulture. Settlement pattern changed to clusters of dwellings in moderately large villages. Pawnee houses continued to be earth lodges but were round instead of square as previously. Artifacts were much as before with the most obvious change being in the surface treatment of pottery where cord roughening gave over to simple stamping with a fair amount of smoothing, plus subtle differences in rimform, decoration and appendages.

Southwestern Nebraska was dominated by Plains Apaches from the early 1500s through the first quarter of the 1700s. Sometime during this period, probably in the early 1600s, the Apaches, who had arrived from Canada as hunters, took up limited horticulture and started building semipermanent dwellings clustered in small to medium-sized villages. The archeological complex representing this semisedentary phase of Plains Apache culture history is called the Dismal River aspect. Tree-ring dates from Dismal River components extend from the late 1600s through 1728, but there is documentary evidence suggesting that the complex was in existence by 1640.

Dismal River houses are distinctive in that they typically had five center posts forming a circle about 4 m in diameter, surrounded by a circle of leaning poles about 6 m in diameter forming the wall. Often there were two posts on this outer circle opposite one side of the pentagon, apparently part of the entrance. A simple hearth was centrally located. Storage (cache) pits are absent but bell-shaped baking pits are found. Shallow trash-filled pits are also common.

Pottery, although not unusually distinctive, is one of the more diagnostic artifacts. It is tempered with fine grit or mica. Vessels are globular or have slightly pointed bottoms with slightly flaring, straight rims. Surfaces are either smooth or simple stamped, and decoration, when present, is restricted to tooling of the lip. Hemispherical bowls also occur. Diagnostic, but rare, are double-pointed, drill-shaped artifacts with one to four lateral projections centrally located. End scrapers, usually very crude, frequently have graver points or spokeshaves somewhere on them. Side scrapers and side-end scrapers are crude and common. Points are small and delicately made: they are triangular, with or without side notches. Crude choppers, knives, drills, and gravers are also found. Ground stone artifacts include paired sandstone shaft smoothers, a diagnostic milling slab, handstones and balls of caliche.

Bone and antler artifacts include various forms of awls, serrated bison metapodial fleshers, bison scapula hoes, stemmed and socketed projectile points, arm bands, tubular beads, flakers, scraper handles, "punches," "spatulas" and shaft wrenches. Turquoise ornaments, painted Tewa Polychrome pot-

tery, and Pueblo clay pipes, all rare, are trade items from the Southwest. European trade goods, also rare, include an iron axe, awls (?), sheet metal cones and gunflints.

Dismal River pottery in Nebraska, and perhaps also Apache houses, show influence, but not direct borrowing, from cultures to the east, probably Arikara and Pawnee. Although the artifact assemblage is much like that of these contemporary Caddoan tribes, the Dismal River complex had a distinctive character, probably reflecting a different cultural tradition and a lesser dependence on horticulture.

After the Apaches, most probably Cuartelejo Apaches, were forced out of southwestern Nebraska, the area saw mainly Comanche and Pawnee hunting parties until about 1800. During the first half of the 1800s, the center of Comanche activity moved farther south and the valley of the Republican River, which drains essentially all of southwestern Nebraska, became a favorite hunting territory of the Kiowa, Kiowa Apache, Arapaho and Cheyenne, as well as Pawnee. By the middle of the 1800s Sioux were coming into the area from the north and the Kiowa and Kiowa Apaches were centering their hunting farther south.

WESTERN KANSAS

This subarea comprises the western 40% of the state of Kansas and includes 90,000 square kilometers of virtually flat short grass high plains west of the 99th meridian. The north half of the area is drained by the Republican and Smoky Hill Rivers, the south half by the Arkansas and Dry Cimarron Rivers. By comparison to the areas to the immediate north, east and south, western Kansas is very poorly known archeologically which may well reflect, at least in part, a paucity of conspicuous sites in much of this area. Fortunately, a systematic archeological survey of western Kansas has recently been started by the Kansas State Historical Society.

Although western Kansas was subjected to climatic fluctuations, it should have supported substantial numbers of large herbivores during much of the Paleoindian Period. The flat land is dotted with numerous playas that are now dry most of the time but fill during wet years. Immediately to the west, where similar playas were deepened to collect irrigation water, is found some of the best evidence for pre-Clovis occupation in the Central High Plains. Apparently mammoths as well as other large animals were attracted to these water holes, which have since been nearly filled with loess. Perhaps mammoths were deliberately driven into these marshy areas by hunters who could then more easily kill them. Since western Kansas should have been at least as lush as eastern Colorado, any occurrence of bones of Pleistocene animals should be carefully examined for evidence of human activity that might suggest pre-Clovis or later complexes. One should not only

watch for obvious stone and bone tools but also expediency bone tools, evidence of butchering on bones and arrangements of skeletal elements that would be unlikely to occur naturally.

Following the extinction of mammoths about 11,000 years ago, the large herbivore most commonly hunted was bison *antiquus*, considerably larger than modern bison. The people who hunted them made distinctive fluted points of much finer workmanship than before; their points and culture were named after the discovery site near Folsom, New Mexico. Interestingly, in 1902 the association of bison bones with a point, probably either Folsom or Clovis, was reported from near the middle of western Kansas. Although the site has been relocated, the point disappeared soon after it was found and only a drawing survives. Apparently no other Folsom site has been excavated professionally in western Kansas although there are points from the area in private collections.

The best information on the Folsom complex as a whole comes from the Lindenmeier site just east of the mountains in northern Colorado. Included in the inventory there were a variety of stone cutting and scraping tools, including distinctive end scrapers with graver spurs on them; channel flakes removed when the flutes were formed are also diagnostic. Frequently points identical to the typical Folsom points but without flutes, and called Midland points, are found associated; some points are fluted on only one side. That various animals in addition to bison were hunted is attested by the presence of their bones at the Lindenmeier site and milling slabs found there indicate the use of plant foods, probably seeds.

Following the Folsom complex and perhaps evolving out of it were a number of complexes characterized by lanceolate points, with basal grinding and sometimes with shoulders. Most were carefully flaked. Some complexes had more than one type of point and all had a variety of other scraping and cutting tools. Frequently the projectile points were repeatedly resharpened as they were being used as butchering and cutting tools. Various of these complexes, known from areas to the northwest, west, and southwest of western Kansas, can be expected to occur there as well. The Firstview complex, characterized by Firstview and San Jon points, is one of the more widespread. Plainview, Milnesand, and Agate Basin points may be part of this complex or may represent distinct complexes. Diagnostic of the Cody complex, which centers farther north than the Firstview but may also be represented in western Kansas, are: Scottsbluff I, II, and III and Eden points, plus Cody knives. The Hell Gap complex, known from Wyoming and the extreme northeast corner of Colorado, is less apt to be found at sites in Kansas. There is a good chance that the Frontier and Fredrick complexes will be found there.

Archaic complex sites, with large, notched pro-

jectile points, spear thrower weights and seed grinding stones, are certain to be found over most of western Kansas. The Archaic people hunted a wide variety of animals, all of modern species, and utilized most available wild plant foods. Except where local situations were especially attractive, they apparently seldom reused camps. Therefore their sites are not likely to be rich. Bison kill sites, however, may be found. Unfortunately, this critical period at the end of glacial times has received very little attention throughout the Central High Plains, and western Kansas is no exception.

Early Ceramic Period sites, according to one well-informed amateur, are abundant in at least the east-central part of western Kansas. Also, the most spectacular Woodland burial from the entire Central High Plains was excavated in the extreme northeast corner of western Kansas, just a few feet south of the Nebraska border. Here, at the Woodruff Ossuary, the disarticulated skeletons of many individuals were found in over-lapping pits along with the articulated skeleton of an adolescent covered with alignments of thousands of shell beads, obviously once strung. Various ornaments made from Gulf conch shells were also included. It seems highly probable that additional ossuaries and Woodland hamlets will be found in Kansas along the Prairie Dog Creek and other southern tributaries of the Republican River in northwestern Kansas. A few other Woodland sites and burials which may be either Woodland or Archaic have been found in various parts of the region. There has been a tendency to assign all of these to the Keith focus, but as additional work is done the manifestations in the southern part may prove to be distinctive. Contact with Woodland peoples farther east is documented by the rare occurrence of Hopewell sherds at sites in western Kansas.

This area is especially crucial to an understanding of the Middle Ceramic Period in the Central High Plains, but unfortunately very little work has been done there. It has been postulated that some of the traits that distinguish the Upper Republican culture from the earlier Plains Woodland culture came from the Southwest and, if so, they would probably have crossed western Kansas. Second, dates for Upper Republican sites in Kansas apparently cluster earlier than those in Nebraska and it has been suggested that the Smoky Hill Phase is ancestral to Upper Republican. And finally, there is a strong possibility that at least some of the Middle Ceramic period Panhandle aspect and Washita River phase peoples moved north and east when their respective occupations in Texas and western Oklahoma came to an end. There is also a general feeling that a few Panhandle, Custer and Washita River sites do occur in the southernmost part of western Kansas.

Along the eastern edge of central and northern western Kansas are sites that have been variously classified as Smoky Hill, Upper Republican and Solomon River phase of Upper Republican. The

sites are small permanent or semipermanent earth lodge villages on terraces close to tillable bottomlands along streams. Subsistence was based on a combination of hunting, gathering and horticulture with surpluses, presumably primarily of maize, stored in bell-shaped cache pits. Pottery is cord-roughened, sometimes partially smoothed over; vessels were globular, with decoration, when present, restricted to the lips, rims, or collars. Projectile points are small and triangular without notches, or with side notches, or with side notches and a basal notch. Cutting tools include various forms with the alternately beveled diamond-shaped knives the most distinctive. End scrapers and chipped drills are common. Bison scapula hoes were apparently the main horticultural implement.

One site, in the edge of Larned, Kansas, is of special significance in that the lowest component, assignable to Smoky Hill, is overlain by a Pratt Focus component in turn covered by several Great Bend house floors, all separated from one another by alluvium deposited by the Arkansas River at the mouth of Pawnee Creek. In the lower levels of this very important stratified site are two strata which probably reflect major drought periods during the Middle Ceramic Period. Additional work at the Larned site, and at similar sites if they can be located, should be undertaken to learn more from these climatic clues as well as more about the apparent developmental sequence from Smoky Hill through Pratt to Great Bend. It has also been suggested that the Pratt Focus, which is best represented along the southern part of the eastern border of western Kansas, evolved out of the Washita River phase of western Oklahoma. On the basis of very limited data, the Pratt focus appears to be a very reasonable transition between Washita River and Great Bend (protohistoric Wichita).

During the Late Ceramic or protohistoric period in western Kansas, the Great Bend Aspect dominated the south half of the extreme eastern edge and the Dismal River aspect dominated most, if not all, of the rest of this subarea. In fact, the Larned site just mentioned might be the only Great Bend site west of the 99th meridian, and it by only 8 km. Contemporary Dismal River sites extend only 25 km east of the 99th meridian.

The Great Bend Aspect (protohistoric Wichita) is perhaps the richest complex of the Central Plains as evidenced both by archeology and by descriptions of Spanish explorers of the 1500s and 1600s. The Great Bend people were first called people of Quivira by the Spanish and later Jumanos. They lived in grass-covered houses situated among their bottomland fields which produced abundant crops of corn, beans and squash. So-called "council circles" on higher ground were apparently ceremonial structures located so as to serve as solstice registers. Pottery was globular with smooth or simple stamped surface treatment and tempered with either shell or

grit. The rest of the artifacts continued much as in the past, consisting of small triangular projectile points, diamond-shaped knives, bison scapula hoes, etc. In addition, painted pottery documents trade with the Pueblo Southwest and limited metal, including fragments of chain mail, was of European origin. Subsistence continued to be based on hunting, gathering and horticulture.

Virtually all of western Kansas was dominated by Plains Apaches during the Late Ceramic period. They arrived from Western Canada around A.D. 1500 as bison-hunting dog-nomads at a time when the high plains were apparently unpopulated. Their 16th-century lifeway in western Kansas is known from ethnohistorical sources, but the earliest archeological sites attributable to them date from the mid-1600s. By then, the Apaches had acquired from their neighbors to the east, primarily Caddoan speakers, the rudiments of horticulture and pottery making, as well as the idea of semi-sedentary villages. Archeologically, the Plains Apache complex of western Kansas in the late 1600s and early 1700s is known as the Dismal River Aspect, which extends into Colorado and western Nebraska. The main known concentration of Dismal River sites in Kansas is in Scott County, near the middle of western Kansas. Most of the Dismal River artifact inventory resembles that of their neighbors to the east. Pottery is globular with a rounded to pointed bottom, slightly constricted necks and simple rims sometimes decorated on the lip and with no appendages. Surface treatment is sometimes simple stamped but more commonly smoothed. Other diagnostic artifacts are end scrapers with spoke shaves and/or graver points and/or side scrapers present, and so-called double-bitted drills. Structures are distinctive in that they most commonly have five support posts; bell-shaped baking pits occur. Subsistence was based on hunting, gathering and horticulture. Micaceous sherds represent contact with their Jicarilla relatives, and painted sherds attest trade with the Tewa Pueblos, both in New Mexico. In the 1730s the Dismal River people were forced to leave the Central Plains by pressure from other tribes; some ultimately settled in Texas and others in New Mexico.

After the Cuartelejo Apaches were forced to leave western Kansas in about 1730, the Comanches dominated the area for the rest of the century, although the Pawnee and Wichita continued to hunt there. After about 1800 the Comanches centered their activities farther south and the Arapahos and Cheyennes dominated western Kansas, with the Kiowa and Kiowa Apaches not infrequently getting into the area. In the early 1800s the Kansa and Osage, who had permanent villages farther east, also hunted in western Kansas. In the mid-1800s, the Santa Fe Trail, which cut diagonally across the southwestern quarter of Kansas, and such military installations as Fort Zarah, Fort Larned and Fort Atkinson, near the Trail, attracted many bands of Indians since

the military had to deal officially with them. In the mid-1800s reservations in eastern Kansas had been established by the government for members of such diverse tribes as the "Oto, Missouri, Iowa, Sac, Fox, Kickapoo, Delaware, Shawnee, Chippewa, Ottawa, Peoria, Kaskaskia, Weas, Piankeshaw, Pottawatomi, Miami, Wyandot, Cherokee, and New York Iroquois" (Wedel 1959: 47). Some of these Indians were occasionally represented in hunting parties in western Kansas. By the late 1800s the last of the Indians that had frequented western Kansas had been put on reservations, none of which were within the area.

NORTHWESTERN OKLAHOMA

The portion of the Central High Plains here called northwestern Oklahoma includes a strip 80 km east-west by 200 km north-south adjoining the panhandle of Texas to the west and Kansas to the north but excludes the Panhandle of Oklahoma. The greatest amount of available archeological information comes from the southern portion which is drained by the Washita River and by tributaries of the Red. Even here much of the culture history, for the preceramic periods, especially, must be inferred from surrounding areas. The panhandle of Oklahoma is dealt with along with the panhandle of Texas.

There is no reason why one should not expect to find important Paleoindian sites in Northwestern Oklahoma since chance finds of diagnostic points have been made there and a wide range of Paleoindian sites have been investigated in neighboring areas. Just east of northwestern Oklahoma a possible Preclovis site has been excavated. Sites including Clovis, Folsom, Firstview, Plainview and other Paleoindian complexes have been investigated within a radius of 250 km, for the most part to the west. Since climatic conditions in Northwestern Oklahoma during the Paleoindian period should have been as favorable as in the adjoining areas for the large herbivores, the lack of reported sites probably reflects the limited work done. In the course of the Paleoindian period, the kinds of animals hunted did change with particular species apparently being favored. During the Clovis and, presumably, pre-Clovis periods the mammoth was the most conspicuous animal hunted although there is evidence that other now extinct species such as the horse, camel and sloth were also hunted. Starting with the Folsom people and extending on into the Archaic periods, bison were the main animals hunted, first the large extinct *Bison antiquus* followed by progressively smaller forms until, at the end of the Paleoindian period, the bison were strictly of the modern species. All through the Paleoindian period smaller animals and various plant foods were certainly also eaten, but these are less conspicuous in the archeological record since a large proportion of the investigated sites are kill sites where the hunting of large animals required the cooperation of several individuals. The

smaller animals are known from remains found in the rare camp sites that have been any more such habitation sites need to be found and excavated. By the end of Paleoindian times, the animals of the Central High Plains were all of modern species. It is still an open question as to what part man played in the extinction of various late Pleistocene forms.

In northwestern Oklahoma, the Archaic period is known primarily from chance finds of diagnostic artifacts and by extension of what is known from surrounding areas. The picture emerging is that Early Archaic sites are far more numerous than are Middle or Late Archaic sites. Since this subarea was apparently subjected to the hot, dry conditions of the Altithermal during the Middle Archaic period, it is not surprising that sites from that period should be sparse here. In any case, the Archaic period was one of adjustment to modern conditions, even if changes did not progress smoothly. Perhaps the stress produced by the environment helped precondition the people for horticulture by making them more dependent on seeds and other plant foods. This would be compatible with the idea that there was population continuity of Caddoan-speaking peoples in the Central Plains starting with late Archaic peoples. It is not certain, however, that there are any terminal Archaic sites in Northeastern Oklahoma.

It is perhaps significant that no Woodland sites have been reported in the western half of Oklahoma, but more likely this reflects the paucity of work. Farther west, in the Panhandle of Texas, the earliest pottery was apparently Jornada brown ware from south-central New Mexico, which is found at some sites with Woodland pottery. To the east, in central Oklahoma, are found Woodland sites with cord-roughened pottery similar to that found even farther east in the Mississippi valley. Since the Custer phase of western Oklahoma and the Panhandle aspect of Texas apparently developed out of indigenous Woodland complexes with eastern roots, one would expect such complexes to exist in northwestern Oklahoma also.

With cultural continuity from Custer Phase through Washita River into Great Bend (protohistoric Wichita) highly plausible, the Woodland antecedents of the Custer phase become an enigma. Perhaps the complex, once it is identified, will resemble the Keith focus found to the north in a comparable environment that is also marginal to horticulture. Considering the geographical closeness between the Custer-Washita River area and the Panhandle Aspect area, these complexes could be expected to share a common Woodland ancestor. The differences in architecture of these middle ceramic complexes probably masks basic and extensive similarities.

Crucial to the understanding of the development of sedentary, semi-horticultural societies in the southern Plains is the Custer Phase, known primarily from a restricted area in west-central Oklahoma.

The Custer phase, dated by radiocarbon at ca. A.D. 800-1100, appears to be transitional between Plains Woodland and Plains Village lifeways and there is general agreement that it is ancestral to the Washita River phase which is found in the same general area. The idea should be seriously considered that it is also ancestral to the Panhandle aspect of the panhandles of Texas and Oklahoma even though, on the basis of published information, the areas of distribution do not overlap. Custer phase sites are small with simple wattle and daub structures, refuse pits and occasional burials. Subsistence was based in part on horticulture as evidenced by bison tibia digging stick tips and bison scapula hoes. Distinctive of the complex is the predominance of cordmarked pottery (Lindsay Cordmarked), and corner-notched projectile points. Other artifacts include: various forms of chipped stone knives, end scrapers, side scrapers, arrowshaft smoothers, grinding stones, stone L-shaped pipes, bone and shell beads and bone awls.

The Washita River Phase was more dedicated to a sedentary, horticultural lifeway. Sites were larger, more varied and more numerous than before. In addition to substantial wattle and daub structures, sites contain numerous storage pits, small burial plots and large cemeteries. Charred remains of corn, beans and gourds have been found in addition to bones of various hunted animals; gathering also continued. Most of the Washita River pottery was smooth with a small percentage cordmarked (Lindsay Plain and Cordmarked). Projectile points were triangular, either unnotched, side notched or side and basal notched traits useful in distinguishing Washita River from Custer sites. Also, Washita River phase pottery was often tempered with crushed shell. Other artifacts were much like those found in the earlier Custer phase sites. Pottery, stone ear spools and marine shells were apparently traded in from Mississippian sites to the east.

The fate of the Washita River phase people is not entirely clear, although a commonly held idea is that they were probably ancestral to at least some of the Great Bend aspect people (protohistoric Wichita). If there are Great Bend Aspect sites in western Oklahoma, they have not been reported in the literature. The movement of people from western Oklahoma to south-central Kansas, where the closest reported Great Bend sites are located, would not have been one of great distance. In fact, the cultural inventories of Washita River and Great Bend are quite similar and there would seem to be less than a hundred year gap between them. The Pratt complex of south-central Kansas would fit nicely as transitional. Furthermore, a movement of Plains village people to the northeast at the end of the Middle Ceramic period in the southern plains would follow the pattern postulated for the rest of the Central Plains.

The question of Late Ceramic period occupation in western Oklahoma has received attention in re-

cent years (Bell and Bastian 1967; Hofman 1978; Baugh 1982). Just beyond the southeastern corner of what is here called Northwestern Oklahoma are the Wheeler and Edwards complexes that apparently form a continuum from about A.D. 1550 to 1750. Both have been defined primarily on the basis of surface collections from two multicomponent sites and have been attributed variously to a continuation of the Washita River phase, to the protohistoric Wichita, to some non-Wichita group, to Apaches, to the Teya (identified both as Protohistoric Wichita and as Apaches). Some of the Edwards complex sites are large with a fortification ditch and have yielded a substantial amount of trade pottery from both the Southwest and the Southeast, suggesting that they were trading or rendezvous sites.

Further excavation at these sites is badly needed. There is the unlikely possibility that historic Wichita villages may be found in Northwestern Oklahoma.

In western Oklahoma, the Comanches essentially replaced the Apaches before the middle of the 1700s and continued to frequent the area until they were put on a reservation. The area also continued to be included in the hunting territory of the Wichita. Early in the 1800s there was an influx of tribes from farther north, especially Kiowa and Kiowa Apaches, although the Arapaho and Cheyenne received the most attention in the mid-1800s. With the establishment of "Indian Territory" and reservations in Oklahoma for many diverse tribes, as in Kansas, hunting parties from these assorted tribes were occasionally found in the western part of the state. One of the major attacks by U.S. troops on Indians was the battle of the Washita River in 1868, where primarily Cheyennes, but also many Arapahos, Kiowas and others were killed. The Cheyennes were under the leadership of Black Kettle, the Kiowas under Satanta and the Arapahos under Little Raven.

TEXAS/OKLAHOMA PANHANDLES

This high plains area, essentially a northward continuation of the Llano Estacado, or Staked Plain, is drained by the Canadian proper and the North Fork of the Canadian river. Included are the panhandle of Oklahoma and the northern half of the Texas panhandle. For convenience, it will be referred to as the Panhandles Area. Culturally, it was most distinctive during the Middle Ceramic period when it was dominated by the Panhandle Aspect (Antelope Creek Focus).

Although relatively few Paleoindian sites have been excavated in the Panhandles, the area was probably as heavily populated then as any other part of the Central High Plains. The type site for the Clovis complex is located less than 100 km south of the southwest corner and the Folsom type site is less than 100 km to the west. To the south are the Plainview, Lubbock Lake and San Jon sites. In the northeast corner of the Texas Panhandle are the

inadequately reported excavations at the Lipscomb Site, a Folsom bison kill. Surface finds of distinctive Paleoindian projectile points attest to the presence in the Panhandles of essentially the full range of paleo-complexes found in the Southern Plains.

During the lush times 11,000 years ago, the Panhandles were much wetter and had enough vegetation to support substantial numbers of mammoth. Hunters using spears or darts tipped with distinctive fluted points pursued these large beasts. The most common approach, apparently, was to maneuver the animals into marshy areas, perhaps at the edge of lakes, where they were less able to move and defend themselves. Sometimes Clovis points are found associated with mammoth bones and sometimes the bones are found stacked in a way that would indicate human agency.

The Panhandles area is in the heart of Folsom country. These hunters specialized in the hunting of large, now extinct, *Bison antiquus* although they also hunted various other animals and gathered wild plant foods. The Folsom complex, which almost certainly evolved out of Clovis, is characterized by points much better made than the latter. Folsom points, also fluted, are the most distinctive of all Paleoindian points. Frequently associated are points identical but unfluted (called Milnesand points). Other Folsom artifacts include end scrapers, often with a spur or graver point, and various cutting and piercing tools. Seeds were ground on simple milling stones and ornaments were made of bone. Much of our information about the non-hunting aspects of Folsom culture comes from the extensive excavated Lindenmeier site in northeastern Colorado. It would be highly desirable to locate and excavate similar sites in the Panhandles.

Following Folsom, and probably evolving out of it, were a number of different Paleoindian complexes, each with diagnostic projectile points. The Firstview complex, as defined by Wheat, should be well represented in the Panhandles since it centers just to the southwest in the Blackwater Draw/Clovis area, is strong in eastern Colorado and at least part of the complex extends on into Canada. It is dated at about 9,000 to 10,000 years ago, has as its distinctive point types Plainview, Milnesand, Firstview, and San Jon, the first two of which Wheat (1972) would consider variants of Firstview points. Firstview is essentially what Sellards called the Portales complex. Some sites have yielded only Plainview points. In any case, one can expect to find sites in the Panhandles yielding well-chipped lanceolate points with edge grinding and basal thinning as well as other less diagnostic scraping and cutting tools.

The Golondrina complex, with Plainview-like points, may also occur in the area; it apparently centers to the southeast. One would also expect to find Cody sites in the Panhandles. In addition to Cody knives, this complex is characterized by Scottsbluff and Eden points, which Wormington would sub-

sume under Cody points. The rest of the complex does not differ greatly from that called Firstview.

The Archaic period in the Panhandles is poorly known, as it is in the rest of the Central High Plains. Sites are very numerous but, perhaps because many are small and artifacts are not abundant, few have been thoroughly investigated. This is an important period for the understanding of Plains culture history, however, since it is a time when plants and animals of only modern kinds were present. Forced to exploit a wide range of food resources, Archaic people were being preadapted for a dependence on cultigens. Also, the Archaic period was a time of marked climatic changes which caused substantial population displacements in the High Plains.

Hughes summarized the information available on the Archaic of the Texas panhandle, including a great deal of unpublished survey data. He noted that sites occur mainly on the rims and terraces of playas, valleys, and canyons and that some of the canyon sites near water sources are deep and rich. Sites may be open camps, rock shelters, bison kills, flint quarries, rock art or burials. Many camps have large quantities of burned rocks. Artifacts include various forms of dart points, many corner notched and broad bladed; Clear Fork gouges, and various forms of knives, choppers, hammerstones and milling slabs. Two Archaic sites have been excavated in the Texas panhandle just south of our study area. On the basis of his work at one of these, Hughes described what he calls the Little Sunday complex.

The Early Ceramic Period in the Panhandles is as poorly known as the Archaic. Much of what is known is based on unpublished survey information (Hughes, personal communication). Apparently the earliest pottery found is Jornada brown ware from the middle Rio Grande area of southeast New Mexico. This is sometimes found alone and sometimes with cord-marked pottery. On the basis of his work at the Lake Creek site, near the center of the Panhandles, Hughes defined the Lake Creek focus. Both kinds of pottery were recovered and he suggested that the cordmarked pottery was in the general tradition of Borger Cordmarked, the dominant ware of the Panhandle aspect, but somewhat earlier. The projectile points were slim, small corner notched forms suitable for use on arrows. Two larger corner-notched dart points and several forms of knives, including the distinctive diamond-shaped, alternate beveled variety, were also recovered. Scrapers were common. Grinding was done on stone slabs with any of a variety of shapes of manos. Hughes suggests that this complex might be ancestral to the Panhandle aspect, an idea that sounds reasonable and deserves testing with additional work.

The Middle Ceramic is the best known period in the Panhandles. At the sites, conspicuous stone wall bases of structures are concentrated along the Canadian River in the middle of the north half of the Texas Panhandle and on the North Fork of the

Canadian in the eastern Oklahoma panhandle. Rooms are round or square, isolated or in blocks of contiguous rooms. A common pattern is a large living room with two attached storage(?) rooms flanking the entrance. Often the floor has a broad east-west trough through the center, leaving something of a bench on either side. There was a central hearth, and four center posts supported the roof; a raised altar against the west wall was a common feature. Walls were commonly constructed of double rows of vertical slabs with the space between filled with earth. Higher rows of wall stones were similarly placed on top of the lower ones with the space between the rows of slabs getting progressively smaller. There is no obvious correlation between detail of structure and either time or geographical location. The use of stone in the structures gives the Panhandle aspect a Southwestern Pueblo flavor but there is no obvious donor complex for the specific architectural techniques involved. The most probable explanation is that we have here a local development utilizing available materials in what is basically a Plains Village Pattern complex. Perhaps the idea of masonry construction and contiguous rooms did come from the Southwest, but the complex can not be considered an extension of Pueblo culture onto the Plains. Repeated rebuilding of structures at some sites indicates successful adaptation to the area.

The artifact inventory of the Panhandle aspect is clearly comparable to other late plains ceramic complexes that were dependent jointly on horticulture, hunting and gathering. Noteworthy among horticultural tools are bison scapula hoes and bison tibiae digging stick tips, which are more common than the hoes. Projectile points are small and triangular, either side notched or unnotched. Other bone and stone artifacts are less diagnostic and include various forms of awls, beads, scrapers, knives and drills. Pottery (Borger cordmarked) is globular with the cordmarked exteriors sometimes partially smoothed over. Decoration is restricted almost entirely to the lip and rim areas which are usually simple and direct. Cambered and collared rims occur in small numbers and are much less common than at Upper Republican sites. Unfortunately, very little numerical information is available on ceramic traits. There is more evidence of trade, especially in pottery, with Southwest Pueblo groups than is found in other complexes of the Central Plains Tradition. Burials are most commonly in hilltop cemeteries, but some are found in the villages. A few skeletons have been found in houses, suggesting violence.

There are apparently no complexes in the Panhandles of Texas and Oklahoma that can be attributed to the descendants of the Panhandle aspect or the Washita River phase people. Presumably, at the end of the Middle Ceramic period, the population migrated or dispersed to the northeast or east to

become, along with others, one or more of the Wichita bands known in historic times. There could have been virtually a depopulation of the area for a half century or more. By 1541, however, the Panhandles were occupied by nomadic bison hunters known to Coronado's party as Teyas and Querechos, identifiable as Apaches. No archeological sites have been definitely assigned to these Apaches, but likely candidates are sites in the area that have painted Pueblo sherds from the 1500s or early 1600s, little or no utility pottery, a generalized plains artifact inventory and tipi rings. By the mid to late 1600s some Apaches were living in more permanent structures, practicing a little horticulture and making thin, plain gray pottery. Sites of this sort are known from the Texas Panhandle on the basis of surveys.

By the mid-1700s the Panhandles of Oklahoma and Texas became the domain of the Comanches who forced the Apaches out. The Comanches took over the trade in bison products to Pueblo people and Spanish villagers. Eventually there emerged traders called Comancheros, who had Pueblo Indian guides. By the early 1800s Kiowas and Kiowa Apaches were also frequently in the panhandles and occasionally Cheyennes and Arapahos would venture into the area on raids, although their territory was generally north of the Arkansas river.

Since various tribes hunted bison in the Panhandles in historic times, there must be evidence of their camp sites, but at present, there is apparently no way to assign the meager evidence at any site to a particular tribe. Presumably some tipi rings date from the Historic period, but artifacts providing such a date are rare. The Panhandle Plains Museum has excavated the ruins of Adobe Walls, near the Canadian River north of Amarillo, Texas. This trading post was visited by Indians in the 1800s but can not be considered an Indian archeological site.

The Alibates flint, or dolomite, quarries deserve special mention. This distinctive material with its numerous shades of red, purple and white was used by many different groups during most of the archeological sequence. The quarries are in a limited area along the Canadian River in about the middle of the Texas panhandle, but flakes and chunks, as well as artifacts made from this material, have been found widely in the Central High Plains. The distribution probably represents a combination of intertribal trade and visits to the quarries by diverse groups. The Alibates quarries have been made into a National Monument.

NORTHEASTERN NEW MEXICO

This area is bounded on the north and east by Colorado, Oklahoma and Texas, on the south by an arbitrary line at the southern border of San Miguel County, and on the west by the foothills of the Sangre de Cristos, but does not include the foothills. The area, essentially a square 200 km on a side, is

nearly all high plains broken by occasional mesas and by the canyon of the Canadian River which is deeply entrenched by the time it reaches the middle of this square. Unfortunately, very little archeology has been done in most of the plains of northeast New Mexico. The archeology of the foothills of the Sangre de Cristos will be treated separately.

There should be many Paleoindian sites in Northeastern New Mexico and some are known to amateur collectors. Blackwater Draw, well known especially as the type locality for the Clovis complex, is less than 100 km south of the southeast corner of the area. Also found at this site, and stratigraphically higher, is a Firstview occupation level for which the name "Portales" was originally suggested. Included in it are San Jon points, named for the nearby town, and Firstview points. In the northcentral part of Northeastern New Mexico is the Folsom complex type site near the town of the same name. Sandia Cave is about 100 km west of the southwest corner of the area, while sites yielding Plainview points are found in the northeast corner as well as just to the southeast. In brief, virtually every Paleoindian complex known in the Central and Southern plains is known from, or very close to, northeast New Mexico.

In addition, pre-Clovis sites are as likely to occur in northeastern New Mexico as elsewhere on the High Plains. Such occupation could be indicated by subtle evidence of human activity such as bone expediency tools for butchering, unnatural arrangements of skeletal elements and butchering marks on the bones. The Clovis complex is known primarily from mammoth kill sites. These often appear to have been marshy areas where large animals were driven to partially immobilize them, making them easier to kill. The distinctive fluted Clovis points would have been hafted on spears or darts. Hopefully, Clovis camp or occupation sites will be found so that more can be learned of the complex.

Folsom, which followed and probably evolved out of Clovis, is also known primarily from kill sites where the finely made fluted points are found associated with the skeletons of the large ancestor (bison *antiquus*) to modern bison. Fortunately, a great deal was learned about the rest of the complex from the excavation of the Lindenmeier site in northern Colorado. There, near a kill site, was an extensive occupation area from which were secured various cutting, scraping and piercing tools, stones for grinding seeds and a few ornaments. The Elida site, just south of northeastern New Mexico, had been a similar Folsom camp. After it was deflated, an amateur collected the artifacts and made them available for study. It would be highly desirable for archeologists to find and excavate additional Folsom camp sites to learn more about other artifacts used and other food resources exploited.

Late Paleoindian sites of the Firstview, Cody, and perhaps other complexes can be expected to yield

variants of lanceolate points with broad parallel-sided stems, basal grinding and very well controlled chipping. Associated tools do not differ markedly from those of the Folsom complex. The main animals hunted were bison, somewhat larger than modern bison, and various other animals of modern size. Again, most of our information comes only from kill sites.

The Archaic period in northeastern New Mexico and surrounding areas is poorly known. It seems likely that the region was virtually depopulated at least once during the Archaic at a time when climatic conditions were very hot and dry. On the basis of limited information, the Archaic sites appear to be most closely related to complexes on the east and southeast rather than to the Picos phase to the west, for example. An examination of private collections would be a good way to quickly test this impression. Also, there may still be undisturbed deposits with Archaic components in some of the caves or rock shelters along the Canadian River where it is deeply entrenched. In the extreme northeastern corner of New Mexico, dry cave deposits were excavated by Renaud some 50 years ago. These have generally been considered of Archaic age, but the dating is poor. Hopefully, additional caves can be found there and investigated under controlled conditions.

The Early Ceramic period is even less well known than the Archaic in northeastern New Mexico. Small sites have yielded a few sherds of either smooth or cordmarked pottery that might be from this period but are probably of Middle Ceramic age. Apparently these represent temporary camps rather than anything approaching permanent settlement. The lack of significant reconnaissance, however, makes speculation fruitless.

The few sherds resembling Taos gray and Borger cordmarked found suggest limited use of the area in Middle Ceramic times. One small site in Harding County on a mesa near Ute Creek appears to be a pit house village of this period, and there is probably a later occupation present as well. One would expect other small villages near permanent water; for example, in the canyon of the Canadian River.

Late Ceramic sites have been found in the canyon of the Dry Cimarron River in the extreme northern part of northeastern New Mexico and at places within sight of the Sangre de Cristos, but a few miles out onto the plains. It seems certain that other Late Ceramic (protohistoric) sites are distributed over northeast New Mexico: there is ample documentary evidence that Apaches and, later, other tribes such as the Comanches frequently hunted on the plains. Many "tipi ring" sites, most of them without pottery, are reported by local collectors and ranchers. These probably date from either the Late Ceramic or Historic period, and most will probably show evidence of only brief, but perhaps repeated, occupation. In well-watered localities, there should be semipermanent

Apache villages, since Spanish documents of the early 1700s mention Carlana Apaches farming in the area. Unexcavated sites along the Dry Cimarron have yielded what appears to be both Jicarilla and Dismal River pottery, the most southwesterly occurrence known of the latter.

By the middle of the 1700s the Comanches had essentially taken over the plains of northeastern New Mexico. Jicarilla and Pueblo hunters continued to venture out into the area until the late 1800s. The late 1700s and early 1800s saw a new phenomenon--the Comancheros. These were Spaniards and/or Pueblo Indians who went to the plains with crude carts carrying bread and other items to trade to the Comanches for products of the bison. Later in the 1800s much of this trade was replaced by Ciboleros, Spanish buffalo hunters, often with Pueblo auxiliaries. In the mid-1800s, Kiowa and Kiowa Apaches were also commonly found in northeastern New Mexico and Indians from as far away as the upper Missouri River would cross the area on their way to trade in Taos and Santa Fe. The Old North Trail, which followed the eastern foothills of the Rockies, was used by such Indians as the Crow and Blackfeet on trips as far south as Mexico.

SOUTHEASTERN COLORADO

This area is bounded on the south and east by New Mexico and Kansas, on the north by the north side of the Arkansas River valley and on the west by the foothills of the Sangre de Cristos, which are essentially a southern extension of the Rocky Mountains. Except for the southeast part of this area, with nearly level plains, the terrain is dissected by the Purgatoire River and its tributaries. Between the deep canyons are level plains or plateaus. Along the New Mexico border are Raton Mesa, including Johnson Mesa and Mesa de Maya, which form a continuous east-west series that still presents a formidable barrier to north-south travel. Much of our information on the archeology of this area comes from the published work of Robert Campbell. Parties from Trinidad Junior College and Colorado College have worked in the western and eastern parts of the area respectively. However, there is still much to be learned.

Published reports of Paleoindian sites in southeastern Colorado are surprisingly few. Clovis and Folsom points have been reported, but often from sites that have at least one other component, so it is always possible that they were carried in by later Indians. Such points did occur at open grassland rather than canyon localities, however. Late Paleoindian points are somewhat more common and do occur also at sites in canyons suggesting the exploitation of a greater variety of resources. One would expect at least a moderate number of sites assignable to Firstview/Plainview/Milnesand complexes,

and probably some of the Cody complex. Although there are deep canyons in the northern part of this area, there are no natural barriers that would keep bison from entering the plateau country from the east.

Archaic sites, early to late, are relatively common in southeastern Colorado and include both open sites and components in rock shelters. Many of the Archaic sites are located in or near canyons, presumably to facilitate the exploitation of varied resources. Hunting was done with spears or darts tipped with points of types suggesting affiliation with Archaic complexes to the southeast. The presence of milling slabs and manos attest to a utilization of vegetal foods as well. Faunal remains represented primarily small mammals. Various cutting, scraping and piercing tools are included in the artifact assemblages as well as bone and shell beads.

Campbell interprets the evidence from the Chaquaqua Plateau as demonstrating an *in situ* development from Late Archaic into Early Ceramic complexes with the selective acceptance of Woodland traits, (primarily cord-roughened pottery, shallow round houses with crude dry-laid masonry walls, and small stemmed projectile points) while retaining most Archaic traits. Animals hunted included more large mammals than was characteristic in Archaic times. He assigns the Early Ceramic sites to the Graneros focus, with three temporal divisions.

Campbell considers the most numerous and conspicuous sites as belonging to the Apishapa focus, a Middle Ceramic complex that presumably evolved *in situ*. His assignment of the Apishapa focus to the Panhandle aspect, however, is not generally accepted in spite of their many similarities. On the other hand, there is little doubt that the Apishapa focus is assignable to the Central Plains Tradition because of its cord-roughened pottery, small triangular projectile points, practice of both hunting and [presumably] horticulture, and small settlements that are considered at least semipermanent.

Apishapa focus houses were characteristically stone slab enclosures, usually round or oval, and built on the surface of the ground or on bed rock. No clues have been found as to the nature of the entrance, and hearths were usually outside. Some structures had several contiguous rooms, but single rooms were far more common. Settlements included up to 37 rooms; many sites were on steep-sided buttes or mesa points and fortified(?) by means of a wall across the point. All sites were near potential farm land. Rock shelters continued to be utilized. Petroglyphs are common in areas with a concentration of Apishapa focus sites. Contact with other areas is documented by the presence of flint from the Texas panhandle and southwest Nebraska, obsidian from New Mexico and Pueblo-like sherds, presumably from near Trinidad, Colorado. The style of many of the artifacts is that found in contemporary plains sites to the east, although the alternately-beveled

diamond-shaped knives and bison scapula hoes have not been found.

Occupation of southeastern Colorado during the Late Ceramic period was apparently far less intensive than in the Middle Ceramic (Apishapa focus) which came to an end before A.D. 1400. Earth rings, and circles of spaced rocks may date from the 1400s, but artifacts and evidence for dating are minimal. On the basis of documentary evidence, Apaches could have been in the area by about A.D. 1500. Some tipi rings, especially the smaller ones, may date from this time, but they could also date from as late as the 1800s. Artifacts, especially diagnostic ones, are consistently lacking or very rare. Limited amounts of pottery have been found in southeast Colorado that support the ethnohistorical evidence for settlements of Apaches engaged in limited horticulture. Other artifacts, such as small triangular projectile points, end scrapers, side scrapers and crude cutting and chopping tools recovered from some of the small, sparse sites can reasonably be attributed to Apaches.

Southeastern Colorado was the home of various bands of Apaches in the 1500s, 1600s and early 1700s. During the latter part of this period, the principal bands were the Penxeyes and Carlanas, also called Sierra Blancas. When the Cuarteles were forced to leave western Kansas and southwestern Nebraska, they joined the Carlanas briefly before the combined group was forced to abandon the area, some joining the Jicarillas in foothills of the Sangre de Cristos in northeastern New Mexico and others joining the Lipan Apaches in western Texas. During the 1700s the Comanches took over southeastern Colorado and were frequently joined there by their Ute relatives. By the 1790s Indians from the north began to appear and in the early 1800s they became more numerous. Although the Kiowas came first, with the Kiowa Apaches, the Arapahos, under chief Bear's Tooth, became a dominant group. Soon they were joined by Cheyennes. Crows, Shoshonis and Blackfeet were also seen. After the Louisiana Purchase in 1804, there was a marked increase in American exploration and travel along the Arkansas River, following what was to become the Santa Fe Trail. Charles Bent built a substantial fort near Las Animas, Colorado and was licensed to trade with the Indians of the area. It was the concentration of Indians there that had attracted Bent and his fort attracted more and more Indians. The Arkansas River was established as the boundary between New Mexico and the United States and well before the mid-1800s it was more or less the "boundary" between the Comanches, Kiowa and Kiowa Apaches to the south and the Cheyennes and Arapahos to the north. Large rendezvous along the Arkansas River, both below and above Bents Fort, attracted large numbers of Indians from diverse tribes as well as Spanish, French and Anglo traders.

NORTHEASTERN COLORADO

This section of high, rolling, short-grass plains consists of 80,000 square kilometers bounded on the north by Wyoming and Nebraska, on the east by Nebraska and Kansas, on the west by the foothills of the Rocky Mountains and on the south by the north side of the Arkansas River valley. The northern part is drained by the South Platte River, the middle by the Republican and Smoky Hill, and the south by the Arkansas. Archeological work has been very spotty, and concentrated, mainly in the northern part except for a far-ranging reconnaissance nearly fifty years ago by E.B. Renaud of Denver University.

In northeastern Colorado, Paleoindian complexes are better known than are later complexes. This could represent the great abundance of such sites in the area, but it probably also reflects other factors. During the drought years of the 1930s there was much wind erosion resulting in many blowouts. These rewarded the efforts of numerous artifact collectors who were especially interested in Paleoindian points. During the same period gullies were being cut, exposing other buried occupation levels. Since then, the population has been keenly aware of the possibility of Paleoindian sites in the area and local people have brought a number of important sites to the attention of professional archeologists in time for them to be scientifically investigated.

The best evidence for pre-Clovis occupation in the Central High Plains came to the attention of the Smithsonian Institution in just such a way when, in the process of deepening two playas in northeastern Colorado, bones were uncovered and reported. The two components thus discovered, at the Dutton and Selby sites, could be as old as 29,000 B.P. Retouch flakes, apparently from a pre-Clovis occupation, suggest the use of flaked stone artifacts although none was found. The presence of bone butchering tools, however, is indicated by specimens which show convincing evidence of use. These were found with the bones of various now extinct animals which showed evidence of butchering. Geological evidence shows that the levels containing detritus represent ancient playas, or at least wet conditions. Hopefully, other pre-Clovis sites will be found that include camp or living areas with a more complete artifact inventory.

Clovis fluted points have been found widely scattered over eastern Colorado, primarily on the surface. At the Dutton site, just mentioned, a Clovis occupation occurs stratigraphically above the earlier, bone-tool, occupation. The Dent site, about 50 km northeast of Denver, Colorado, is important in the history of archeology since it was here that the first generally accepted find of projectile points (Clovis) with mammoth bones was

made. Relatively little has been learned about the culture of the Clovis people other than that they hunted mammoths with spears or darts tipped with rather crude fluted points, and that the favorite hunting technique was to attack the mammoths when they were at least partially mired down in boggy areas. Several Clovis components have been dated by radiocarbon; their ages fall within an amazingly short span of about 500 years, 11,000 to 11,500 years ago. The Clovis complex has no obvious ancestor in North America, and archeologists are coming more and more to believe that it came from Siberia some 11,500 years ago and spread rapidly over much of North America. Not only should localities producing mammoth bones be carefully investigated for evidence of Clovis occupation, but Clovis sites should be tested for possible earlier components, and northeastern Colorado is a likely area for both.

Following Clovis, and probably evolving from it, is the Folsom Complex, noted for its well-made fluted projectile points with which large, now extinct, bison were hunted. The Folsom complex is known from surface finds of the distinctive points over much of northeastern Colorado. Furthermore, the Lindenmeier site, which has given us more information on the Folsom complex than any other, is located at the western edge of the plains in extreme northern Colorado. Many of the dart or spear points found at Folsom sites have long, broad flutes expertly produced by the removal of a single flake from each side of the point; other flaking on the points is equally well controlled. Some points were fluted on only one side, and others, of the same shape, but left unfluted, are called Midland points and probably should be assigned to the Folsom complex. Equally diagnostic of this complex are the channel flakes, often broken, that were removed from the points and sometimes used as cutting tools. Other chipped stone artifacts include a variety of cutting, scraping and perforating tools. Of special interest are end scrapers with a graver point somewhere on the artifact. These do not appear in ceramic period sites excepting those of the Dismal River aspect (protohistoric Plains Apache), where they are also common. The best explanation for this similarity is that they represent a similar response to shared problems.

During the three millennia (ca. 10,500 to 7,500 years ago) following the Folsom period, there was a proliferation of complexes and a divergence of point types in the high plains. Some of these complexes are widespread, and others, on the basis of present evidence, appear to be limited to a small area. There appears to have been an especially large number of complexes in northeastern Colorado and southeastern Wyoming during this period. Their presence may reflect concentrated

field work in the area, or the convergence there of eastern and western traditions, and possibly northern and southern traditions as well. Projectile points of late Paleoindian complexes, without flutes and without notches, tend to be lanceolate in shape: stems, when present, are parallel-sided with ground edges, and workmanship is generally of high quality. Points were commonly used not only on darts or spears, but as butchering and cutting tools. The basic shapes of the latter were markedly altered by progressive resharpening. Broken points were commonly reworked either for reuse as projectiles or for use as tools of some other kind. Other chipped stone tools included various forms for cutting, scraping and perforating. Sandstone abraders were apparently used for shaping or sharpening bone and wooden artifacts, and milling slabs and hand stones were presumably used for grinding seeds. Bison were commonly hunted, with bison *antiquus* giving way through transitional forms to modern bison *bison*. Post-Folsom Paleoindian complexes reported from northeastern Colorado or nearby areas include: Agate Basin, Hell Gap, Alberta, Cody, Kersey, Firstview (including Milnesand and Plainview), Frederick, and Frontier. Some of these include a number of different named point types. Not surprisingly, there is no general agreement on the definitions of all late Paleoindian complexes.

The Archaic Period in northeastern Colorado is only sketchily known, and here again there is general lack of agreement both on the definition of complexes and the assignment of sites to the complexes that have been proposed. Most of the archaic sites investigated in Colorado are in either the Denver Basin or the mountains to the west and north of Denver. Investigation of high altitude sites north and west of Denver supports the concept of an Altitheirmal in early Archaic times, with two periods of increased occupation in the mountains at times when there was a decrease in population on the plains. Presumably, during these periods there was more effective precipitation and hence more abundant game at higher altitudes than on the plains. Low altitude sites in northeastern Colorado tend to provide minimal information.

The Archaic peoples depended more heavily on gathering than did the Paleoindians but hunting was still very important. There is no evidence of the hunting of any but modern forms of animals although species not in the immediate area today are represented at some sites. The main hunting weapons were spears and darts used with atlatls. Points range from large to medium-small with notched forms becoming common toward the end of the Archaic. Various cutting, scraping, piercing and grinding tools are also found. Many of the artifact types continued into the Early Ceramic period, making it difficult to assign some sites, such as burials, to either the Archaic or Early Ceramic. A

great deal of additional work needs to be done at Archaic sites, since it was then that cultures were adjusting to modern climate, plants, and animals while at the same time responding to marked climatic fluctuations. Furthermore, during the late Archaic period we see the beginnings of specific cultural traditions that lead to historically known tribes.

In northeastern Colorado complexes of the Early Ceramic period are not much better known than those of the Archaic. Early Ceramic (Woodland) complexes farther east closely resemble those of the late Archaic, with pottery and minimal horticulture added. It is not surprising that people in the process of developing a semi-sedentary life way are poorly represented west of the limit for effective dry-land farming. In northeastern Colorado cord-roughened pottery resembling Woodland pottery from Nebraska and Kansas is occasionally found, but thus far no sites suggest permanent or long-term occupation. A few possible exceptions are sites in the foothills of the Rockies, where gardening might have been possible along streams rising in the mountains. Most Early Ceramic sites, however, can best be interpreted as camps of people from farther east who were in or going through the area for hunting, trading or other purposes. The diagnostic artifacts for this period are thick, cord-roughened pottery with simple rims and long pointed bodies, and small to medium-sized triangular projectile points with a stem or corner notches. The rest of the inventory is essentially that of the archaic, although many of the other artifacts also closely resemble those found in later complexes. Some burials have been assigned to this period because the mortuary practices seem to resemble, in an attenuated form, ones found to the east, such as placing several burials in a very limited area and the inclusion of shell beads.

Middle Ceramic complexes in northeastern Colorado are also poorly known but could prove to be very important in the interpretation of plains culture history. Much of the rather meager sample of cord-roughened pottery from the area is not clearly of either Woodland or Central Plains affiliation and could possibly be transitional. There is convincing evidence that a new race of maize entered the plains from the Southwest at the beginning of the Middle Ceramic period, possibly, even probably, accompanied by the ideas of globular pottery vessels and earth-covered shallow pit structures. A deliberate effort should be made to find and carefully excavate sites that could be transitional. Accurate tree-ring chronology is badly needed, since other methods of dating are not sufficiently precise. Radiocarbon dating seems to be especially erratic during this period. As for typological differentiation, where pottery is not highly diagnostic, the assignment of sites to periods can also be based on projectile point types. Small stemmed or corner-notched points occur in the Early Ceramic period and small triangular

points without notches or with side notches and a basal notch are diagnostic of the Middle and Late Ceramic periods. By Late Ceramic times cord-roughened pottery was apparently no longer being made.

One Middle Ceramic site near Limon in the middle of the eastern half of Colorado is especially interesting in that the pottery is identical to that found at Upper Republican sites in southwestern Nebraska. The rims, many of which are braced and decorated, contrast markedly with the much plainer rims found at other Middle Ceramic sites in eastern Colorado. It is perhaps significant that this site near Limon is at the head of a major branch of the Republican River which could have served as a convenient travel route from the Upper Republican aspect heartland. Even here, however, there is no indication that the site contained horticultural tools or the substantial earth lodges found farther east. Except for possibly a few sites near the foothills of the Rocky Mountains, the Middle Ceramic period sites of northeastern Colorado, like Woodland sites, can be best interpreted as temporary camps occupied by people from farther east while crossing the area for hunting or trading. Other than pottery and projectile points, few if any of the artifacts found at these sites are diagnostic.

During the Late Ceramic period, northeastern Colorado was dominated by Plains Apaches who probably arrived about A.D. 1500 and were forced out by the mid-1700s. By the middle of this two-and-a-half century occupation, the Apaches in the eastern part of the Central High Plains had adopted pottery making, limited horticulture and villages of semi-permanent dwellings; archeologically this complex is known as the Dismal River aspect. Dismal River pottery, distinguished by its general plainness, with occasional sherds containing finely divided mica and/or having a simple-stamped (grooved) surface treatment, occurs sparsely over Colorado east of the Rocky Mountains. Apparently only one Dismal River village, with small pit houses, is known in eastern Colorado, and that occurs as a second component at the anomalous sites near Limon in the middle of the eastern half of Colorado. Twentieth century climatic maps show greater precipitation here than to the north, west, or south, a circumstance that, if true earlier, could account for the village. Stone artifacts of the Dismal River component, other than the very well-made small projectile points, are quite crude, but basically resemble those of other Late and Middle Ceramic Plains complexes. Apache end scrapers are interesting in that many have graver points and/or other scraping edges as well as the snub-nose; traits also found in some Paleoindian complexes. Another diagnostic stone artifact is "cigar" shaped, resembles a double-pointed drill, and has one to four centrally-located projections; these objects, however, have not yet been reported from Colorado. One small, well-

made, portable metate, of a type known only from Dismal River and Jicarilla archeological sites and ethnographically from the Jicarilla Apaches, is known from near the middle of eastern Colorado. Dismal River houses, with a distinctive five-center-post pattern are also unreported from Colorado. Plains Apache complexes of the 1500s have not yet been identified. Throughout their occupation the Apaches remained primarily hunters.

From the 1500s until about 1730, northeastern Colorado was the hunting territory of Paloma and Cuartelejo Apaches who may have had a few semi-permanent villages there. A few Shoshonis probably got into the area also. The Comanches (and possibly Shoshonis) forced the Apaches out of the area about 1730 and became the dominant group there until the end of the 1700s, although the Pawnees and, to a lesser extent, Wichita, went on hunting expeditions into northeastern Colorado. Shortly after 1800 the balance of power in that area had shifted to the Arapahos, Cheyennes, Kiowas and Kiowa Apaches, with the Comanches centering their activities farther south. Other tribes from the north, such as the Shoshoni, Blackfeet, Crow and Sioux, also hunted over much of northeastern Colorado. By the mid-1800s the Kiowa and Kiowa Apaches had also shifted their activities farther south, but they and the Comanches continued to be observed north of the Arkansas River as well, until all were placed on reservations. There were no well-defined boundaries between the hunting territories of these various nomadic tribes. Many Indians and whites crossed northeastern Colorado on their way to major rendezvous in the foothills of the Rockies. One of the most notorious attacks by American troops, the Sandy Creek Massacre, took place on the Big Sandy near its big bend.

NORTHERN COLORADO FOOTHILLS

The area here called the northern Colorado Foothills extends north from Colorado Springs to the Wyoming border and is drained primarily by the South Platte River. The plains abruptly meet the mountains, which can be seen from many miles to the east. Preceramic complexes have received the most archeological attention in the area, which probably reflects the greater abundance of preceramic.

During the Paleoindian period, there were apparently as many different complexes to the east of the foothills in the plains of northeastern Colorado as anywhere else in the Central High Plains. Essentially meeting there were complexes that had their centers to the north, south, east and west. One could expect to find sites of any of these up to the Front Range, but since they all specialized in hunting large plains herbivores, sites of Paleoindians are probably quite rare in the rough country at higher elevations. Included in the plains just to the east of the mountains are Preclovis (?), Clovis, Goshen (?), Folsom, Mid-

land, Firstview (including Plainview and Milnesand), Hell Gap, Kersey, Cody, and Fredrick (?). Each was characterized by particular types of spear or dart points, some of which graded into one another to form a continuum. All had a variety of cutting and scraping tools and the points were often used as knives for butchering and were resharpened repeatedly. Large animals constituted a major part of the diet and were probably hunted cooperatively. First mammoth, probably plus camel and horse, then the large *Bison antiquus* and, later, progressively smaller bison, but ones still larger than the modern form.

Two Paleoindian sites in the northern Colorado foothills are of special significance. Just south of Denver is the Lamb Spring site which may have had a Preclovis occupation, although additional work at the site has made this questionable. There was clearly an assemblage of extinct fauna dating from Preclovis times at the site, but evidence of associated human activity is unclear. There was, however, a later Cody Complex occupation at Lamb Spring, and the site did demonstrate that conditions were right in the Denver Basin for various species of now extinct mammals during Clovis times and probably for several millenia before. Thus, this would be a likely locality for very early Paleoindian occupation and any manifestation of late Pleistocene age that yields faunal materials should be carefully examined for tools, especially inconspicuous expediency tools made from broken bones, and for butchering marks on the bones, as well as any other evidence that suggests human activity.

The Lindenmeier site, located essentially in the Colorado Foothills just south of the Wyoming border, has provided us with more information on the Folsom Complex than has any other. The site, excavated in the 1930s primarily by the Smithsonian Institution, consisted of both a bison kill area and a large living or camp area. This is still the only large Folsom habitation site to be professionally excavated.

Faunal remains from the Lindenmeier site included not only bones of *Bison antiquus* but also of a large variety of smaller animals. Milling slabs suggested that seeds played a significant part in the diet. The carefully made fluted points diagnostic of the complex were abundant and identical, but unfluted specimens, called Midland points, were also recovered; some points were fluted on only one side. Numerous flakes removed from the points in the fluting process were recovered and showed evidence of having been used as knives. Given the large sample, and points at various stages of manufacture, much was learned about the flint knapping techniques employed. In addition to stone and bone tools, several beads or ornaments were also found.

In contrast to the general situation, the Archaic is the period most thoroughly investigated in the northern Colorado foothills. Most notable has been the

work at the Magic Mountain and LoDaisKa sites near Denver and at various high altitude sites north and west of Denver. It is fortunate that interest has developed here since several different Archaic complexes, with their centers to the southeast, southwest, west and north, appear to meet or at least occur here. Also, the high altitude sites appear to represent population movements to climatically more favorable spots when the hot, dry Alithermal periods resulted in depopulation of the plains.

The Logan Creek complex is apparently present but poorly represented in the Foothills. The Mount Albion complex, which is known primarily from high altitude sites, has been more completely described than any other Early Archaic complex in northern Colorado. The more spectacular and informative of the many sites attributed to this complex are extensive game drives at 3500 m elevation, well above timberline almost to the continental divide. These sites have long dry-laid rock walls, numerous cairns, concealment pits, and camp/butchering areas. In addition to the diagnostic Mount Albion projectile points, the artifact inventory includes various cutting, scraping and piercing tools. Radiocarbon dates cluster around 5700 years ago, during the Alithermal period. Other similar but more recent Early Archaic complexes are the Albion Boarding House and the Fourth of July Valley complexes.

The deeply stratified Magic Mountain site, just west of Denver, was interpreted by Irwin-Williams and Irwin as having been occupied sporadically by two groups of Archaic people who had quite different artifact assemblages. The earlier of the two they called the Magic Mountain complex and the later, Middle Archaic, complex which overlapped considerably in time with it, the Apex complex. In spite of the overlap, they suggested little interaction between the two groups, whose artifact assemblages were sorted out on the basis of typology. The Magic Mountain complex, distinctive in that many of the tools were apparently composite, utilizing small prismatic flakes, has a distribution along the foothills from Denver north to the Wyoming line. Benedict interprets the oldest material at the Magic Mountain site as a mixture of Mount Albion artifacts with those of some other complex. One burial from the foothills is of Early Archaic age but none of the associated artifacts were diagnostic.

As for the Middle Archaic period, at least three different complexes have been proposed for the northern Colorado foothills. The McKean complex, with its highly variable points, probably extended this far south. The validity or uniqueness of the other two, Apex and LoDaisKa D, has been questioned on the basis of later work in the area. It has been suggested that the Apex complex is the northernmost manifestation of the Pico or Elementary Southwestern Culture considered to be ancestral to Pueblo cultures. Another interpretation is that

there was a single complex centering in the Foothills that lasted through both the Early and Middle Archaic periods. Other sites of probable Middle Archaic age have been reported from the Foothills but not assigned to particular complexes; included are Archaic components at the Lindenmeier and Lamb Spring Paleoindian sites.

The Late Archaic period is characterized by the appearance of large corner-notched or broad expanding stem points. The number of Archaic sites on the plains apparently increased while the occupation of the foothills of northern Colorado decreased, at least relatively. At the Magic Mountain site this period is represented by Complex B which is above the late Apex material and is dated at about 2000 years ago. A few other sites in the Denver Basin and along the Foothills are also of Late Archaic age, but in general they have contributed little additional information.

Sites, or more commonly components at sites, attributed to the Early Ceramic period are moderately common in the northern Colorado foothills. Nearly all, however, appear to have been occupied only briefly. Assignment is based on a few cord-roughened sherds, small corner notched or stemmed projectile points, or on radiocarbon dates. Most of the sites are rock shelters where the evidence is found in the upper layer if the deposit was stratified. Three phases have been suggested although many sites are unassigned. In the northern Foothills and extending on into the plains, the sites are most commonly assigned to the Ash Hollow Phase which is best known from the panhandle of Nebraska. In the northern foothills in general, sites are most commonly seen as having Parker Phase affiliation. Both of these phases would seem to be western extensions, perhaps temporary camps related to Woodland complexes centering much farther east; similarities to Keith focus have been mentioned. The third phase, to which the name Hog Back has been applied, is of special interest in that it seems to be mountain rather than plains oriented and sites range in elevation up to the tundra zone. It has been suggested that the Hog Back phase might represent Shoshonean peoples who secured a little cordmarked pottery from Woodland affiliated people to the east. One of the sites contained two structures with crude rock walls or wall bases. Some of the high altitude sites assigned to this phase have game drive features consisting of stone walls and cairns. A Hog Back phase affiliation has been proposed for several sites once considered to be Parker phase.

Middle Ceramic period sites in the northern Colorado foothills appear to be neither large nor numerous. Withers suggested that the Franktown focus, which he defined, could be transitional between the Woodland (Parker focus) and Upper Republican (Buick focus), an idea that should not be discarded. Unfortunately, there is very little in the literature on the Franktown focus which presumably occurs all

along the northern foothills of Colorado; it is unclear how far east it extends. Except along the Wyoming border, there are apparently no known Upper Republican sites closer than 80 km from the foothills. Even the sites farther out appear to be small temporary camps, often in rock shelters. Some sites lacking diagnostic artifacts have been assigned to the Middle Ceramic period solely on the basis of radiocarbon dates.

During the Late Ceramic (protohistoric) period, the northern Colorado foothills were utilized by both Apachean and Shoshonean peoples for hunting and gathering. No indication of even semi-permanent settlements has been reported for either. Dismal River (Plains Apache) sherds have been found at various sites, probably left there by parties from farther east during the late 1600s and early 1700s, but earlier nonceramic Apache sites have almost certainly gone unidentified. Flat-bottomed pottery of a type associated with Shoshonean people farther west and north has been found in one cave just southwest of Denver.

During the historic period and probably long before, the foothills of the Rocky Mountains provided a major north-south travel route extending from Mexico north into Canada. This was "The Old North Trail" of the Blackfeet which later became the route of cattle drives and is now followed for much of its distance by Interstate Highway 25. Rivers from the east and mountain passes from the west provided feeders to this corridor. Three major rendezvous locations existed in the foothills of northeastern Colorado. One was on Cherry Creek where Denver is now located. Not far north of Denver, Ceran St. Vrain established a trading post, essentially a satellite of Bent's Fort on the Arkansas, which served as a second rendezvous. A third was near the Platte a little farther north. From the 1500s until near the middle of the 1700s plains Apaches were the main Indians in the foothills, but they were replaced by Comanches. Shoshones and Utes also got into the area. Starting with the very early 1800s the Arapahos and Cheyennes became numerous, along with Kiowas and Kiowa Apaches. Blackfeet, Crows and Sioux were probably the next most common.

SOUTHCENTRAL COLORADO

This area includes the eastern foothills of the Rocky Mountains that are drained by the Arkansas River plus all of Colorado drained by the Rio Grande. It extends from Colorado Springs south to the New Mexico border and west to the continental divide; the San Luis Valley makes up much of the area. South-central Colorado can be best characterized archeologically as showing unquestionable influence from the Pueblo Southwest. Except for the Trinidad area, however, there is relatively little information in the literature about the archeology of this area of some 40,000 sq. km. although work is

continuing there.

The only Paleoindian site that has attracted much attention is the Linger site, a Folsom manifestation in the San Luis Valley, and very little has been published on it. There is no obvious reason why Clovis or even Preclovis sites and additional Folsom sites should not be found there. Certainly, any occurrences of bones of late Pleistocene fauna should be carefully examined for evidence of human activity. On the Late Paleoindian level, one would also expect to find Firstview/Plainview/Milnesand complex sites and probably Cody complex sites as well. Each complex has diagnostic projectile points plus a variety of other cutting and scraping tools which are not diagnostic. Bison were the large herbivores hunted by each group, but smaller animals also apparently contributed to the diet as did various plants. Hunting was probably a communal or joint effort for each group.

Both Early Archaic and Middle Archaic sites have been reported from northwest of Trinidad, Colorado on the basis of survey data. The evidence, however, is very sparse, averaging less than one point per site. The Picoso complex, presumed to be ancestral to the Pueblo cultures, extends at least into the San Luis Valley. Since high altitude Archaic sites have been reported from both north and south of southcentral Colorado, one would expect them to occur there as well. More research is needed on the Archaic of this area since it is here that the plains and the Southwest culture areas meet. Also, it is the beginning of essentially modern environmental times.

An Early Ceramic complex, the Graneros focus, could prove to be very important in the reconstruction of plains culture history. Graneros sites are known only from the Arkansas drainage in southern Colorado, with the type site occurring at the edge of the foothills. Pottery from the complex is pointed bottomed with simple rims and a cord-roughened surface treatment, reminiscent of Woodland pottery from the eastern High Plains. The projectile points are small and corner notched or stemmed, also like Woodland points. One of the two known structures is a small oval pithouse with a covered entrance way. The other is round with eight support posts set near the wall and partially surrounded by dry-laid masonry.

Along the Purgatoire River in the foothills of extreme southern Colorado, the Late Ceramic period is represented by the Sopris Phase. This can best be interpreted as part of an indigenous tradition which was strongly influenced by Pueblo culture of the Upper Rio Grande in New Mexico, especially in ceramics and architecture. The structures are of adobe but without a set style. Some of the pottery seems to be a local imitation of Pueblo pottery, which occurs as trade material. Subsistence was apparently based on a combination of hunting, gathering and horticulture. The relationship of the

Sopris phase to other indigenous complexes needs to be worked out. The occurrence of Pueblo pottery in the San Luis Valley has been noted, but the nature of the occupation has not been established in the literature.

The only Late Ceramic complex identified in southcentral Colorado can be attributed to Plains Apaches, probably representing the western thrust of the Dismal River aspect from western Kansas and Nebraska. At some of these sites, Jicarilla pottery from northeastern New Mexico has been recovered. Perhaps there are semipermanent villages along the foothills, but this has not yet been demonstrated. Earlier identification of sherds from the San Luis Valley as Dismal River was in error.

The intermontane area of south-central Colorado was Ute territory. It is essentially the area drained by the Rio Grande, plus the parks farther north drained by tributaries of the Arkansas. By 1706 Comanches were getting into the area from their homeland in Wyoming. Jicarilla Apaches and Navajos also entered the area but apparently not frequently or in large numbers. Passes from the Plains to the San Luis Valley provided access to the Upper Rio Grande, which, in turn, provided routes for Indians and whites who were going to and from Taos and Santa Fe in New Mexico. In the eastern foothills of the southern Colorado Rockies, semisedentary Apaches were early (c. 1720) displaced by Comanches, who by the late 1700s essentially had a stronghold there. Their flamboyant chief, Greenhorn, was an effective leader who was finally crushed by New Mexico's even more effective governor, Juan Bautista De Anza, who, in a very short-lived endeavor, tried to settle the Yupe Comanches in a permanent village at San Carlos, on the Arkansas. The Old North Trail, as stated elsewhere, followed the foothills here and the main branch of the Santa Fe Trail went over Raton Pass. One important rendezvous area was near Pueblo, Colorado where the Arkansas River leaves the foothills. The most famous, however, was at Manitou Springs or Boiling Springs on Fountain Creek just west of Colorado Springs, probably because of the unusual nature of the springs. The vicinity was essentially held sacred by the tribes that came here to trade with one another as well as with French, Anglo and Spanish traders. The Arapaho was the tribe that apparently felt most attached to the Manitou Springs area in the mid-1800s.

NEW MEXICO FOOTHILLS

The area here dealt with includes a narrow band some 200 km north and south where the short-grass plains abruptly meet the Sangre de Cristos. It extends from Raton, New Mexico, just south of the Colorado border, to the southern edge of the Central High Plains, some 50 km south of Las Vegas, New Mexico. Archeologically, the most conspicuous difference between the New Mexico foot-

hills and northeastern New Mexico is the presence in the foothills of permanent villages that have unmistakable affiliations with the Pueblo occupations to the west. Canyon mouths are fertile and well-watered by streams that head in the Sangre de Cristos. They are also close to the diverse natural resources provided by both the mountains and the plains. Although the elevation is about 2100 m, limited horticulture is possible and still commonly practiced.

In the Cimarron, New Mexico, area Glassow has defined a series of archeological phases on the basis of extensive survey and limited excavation. Evidence of Paleoindian and Archaic occupation is very scant. Corn horticulture appears to have come in about 400 to 700 A.D. along with simple circular surface structures outlined with horizontal rock slabs. After an apparently very sparse earlier population, sites with pithouses and pottery similar to Pueblo I pottery elsewhere in the Southwest are reported. During the 1100 to 1250 period, especially after the midpoint, there was a marked population increase with multiroomed surface structures, some including rectangular kivas, and ceramics that show similarities to contemporary wares in the Taos area, with many of the culinary vessels showing broad-line incised decoration. Throughout the development of the Pueblo occupation, corrugated ware was rare and painted trade sherds were varied but not common. The Cimarron manifestations differ enough from those in the Taos area that they should be considered separately and not just an extension over the mountains from the Taos area. Strangely enough, there is little or no evidence of plains contact at the Pueblo sites in the Cimarron area even though they were the Pueblo sites closest to the major plains populations. By about A.D. 1300 the Cimarron area appears to have been completely depopulated until the appearance of Apaches in the early or mid-1500s.

Farther south along the foothills, near Las Vegas, New Mexico, a wide variety of Paleoindian points and a few archaic points are represented in private collections, most from badly deflated sites. No published reports of professionally excavated sites, however, are available. There are numerous Pueblo sites a little way back into the foothills along the Pecos River and its tributaries which have broad valleys. All of these have their cultural ties with the Santa Fe-Galisteo Area. Especially rich in ruins is the Pecos valley itself, from Pecos Pueblo to a little way below Anton Chico and along Tecolote creek from a little way above Tecolote to the mouth of the creek. Along the foothills north of Las Vegas, however, the number and size of the sites are greatly reduced, the largest being at Watrous, New Mexico. This latter is anomalous in that it is in the drainage of the Canadian but has ties to the Santa Fe-Galisteo Area. Apparently all other foothill Pueblo sites in the Canadian drainage have their cultural ties with the

Taos area. There are probably earlier Pueblo sites in the Las Vegas area but the ones noted thus far apparently date from after about 1000 or 1100. Excepting Pecos Pueblo, ruins which date from after about 1250 or 1300 are rare.

Apache archeology is well represented in the foothills of northeastern New Mexico. Sites that may be Apache of the late 1500s and early 1600s have been located in both the Las Vegas and Cimarron areas. These have a few glaze-paint sherds, apparently all from Pecos, but little or no utility ware. Lithics include a substantial proportion of Alibates dolomite from the panhandle of Texas, as well as obsidian. A site near Anton Chico has several small tipi rings with associated glaze waxes of the mid-1500s.

A large tipi ring site near Las Vegas has an abundance of utility ware, probably Apache, and glaze sherds from both Pecos and Picuris that date it in the mid to late-1600s. Most numerous, especially in the Cimarron area, are sites of circa 1700 with distinctive thin Ocate Micaceous pottery of Apache manufacture, a Plains-like artifact assemblage, and limited amounts of white trade material and painted Tewa sherds. Structures excavated include a seven-room adobe walled pueblo, a small pit house, a rectangular structure with adobe and pole wall construction, baking pits and storage or cache pits. Spanish accounts of ca. 1700 report numerous Jicarilla sites in the area with a variety of house types, irrigation and abundant crops. Apache sites of the last half of the 1700s and early 1800s, after the Comanches drove the Jicarillas from the east side of the mountains, have not been found. Sites with tipi rings or small crude stone structures, thick micaceous pottery, more abundant white trade goods and Pueblo pottery have been identified as Apache sites of the mid- to late 1800s.

Ethnohistorical information is relatively rich for the foothills of northeastern New Mexico. We learn from the Coronado documents that Apaches (Teyas and Querechos) had reached the southern plains and the pueblo area at about 1525 and from the Onate documents that Apaches were living in "pueblos" northeast of Taos circa 1600. Detailed accounts of 1706 and 1719 by Ulibari and Valverde describe Apache villages near Cimarron. The Faraon Apaches were frequenting the Las Vegas area and Pecos Pueblo. Increasing Comanche pressure, starting in the early 1700s, forced the Jicarillas to move west to the Rio Grande valley by 1750. For the last half of the 1700s Comanches dominated the foothills. In the early 1800s Arapahos, Cheyennes, Kiowas and Kiowa Apaches moved south into the Upper Arkansas River area, where Spaniards went to trade with them. The Comanches by then were centering their activities in western Texas. Throughout most of the 1800s both bands of Jicarillas, often in the company of Southern Utes, were still venturing into the foothills area to hunt. Starting by at least the early 1700s, the Spanish and later the Americans

were using several well-established trails from the Rio Grande valley across the Sangre de Cristos into the foothills. These fed into what was to become the best known of all, the Santa Fe Trail, the mountain route of which followed the foothills from Raton to Las Vegas and on to Pecos pueblo and Santa Fe.

REFERENCES CITED

- Abel, Annie H., ed.
 1915 The official correspondence of James S. Calhoun. Washington: U.S. Government Printing Office.
- Abel, Annie H.
 1939 Tabeau's narrative of Loisel's expedition to the upper Missouri. University of Oklahoma Press, Norman.
 1941 Indian affairs in New Mexico under the administration of William Carr Lane, from the journal of John Ward. New Mexico Historical Review, vol. 16, pp. 206-232.
- Abert, J.J.
 1846 Communicating a report of an expedition led by Lieutenant Abert, on the upper Arkansas and through the country of the Comanche Indians in the fall of the year 1845. Senate Doc., 20th Cong., 1st Sess.; no. 438.
- Adams, E.B.
 1953 Notes and documents concerning Bishop Crespo's visitation, 1730. New Mexico Historical Review, vol. 28, pp. 222-233.
- Agenbroad, L.D.
 1973 A Paleo-Indian bison kill in the panhandle of Nebraska. Transactions of the Nebraska Academy of Science, vol. 2, pp. 57-61.
 1974a The Hudson-Meng site: an Alberta bison kill in the Nebraska high plains. Paper presented at the Thirty-second Annual Plains Conference at Laramie, Wyoming.
 1974b Results of the third field season: Hudson-Meng Paleo-Indian bison kill, northwestern Nebraska. Paper presented at the Thirty-ninth Annual Meeting of the Society for American Archaeology at Washington, D.C.
- Agogino, George A.
 1961 A new point type from Hell Gap valley, eastern Wyoming. American Antiquity, vol. 26, pp. 558-560. (PaleoIndian)
 1969 The Midland complex: is it valid? American Anthropologist, vol. 71, pp. 1117-1118.
- Agogino, George, and James Duguid
 1963 The Plainview point: a brief summary. Southwestern Lore, vol. 29, no. 2, pp. 37-39.
- Agogino, George A., and Eugene Galloway
 1965 The Sister's Hill site. A Hell Gap site in north-central Wyoming. Plains Anthropologist, vol. 10, pp. 190-195.
- Agogino, George A., and Frank C. Hibben
 1958 Central New Mexico Paleo-Indian cultures. American Antiquity, vol. xxiii, no. 4, pt. 1.
- Allen, Paul (editor)
 1814 History of the expedition under the command of Lewis and Clark. ...2 vols. Philadelphia.
- Anderson, Adrienne Barbara
 1975 "Least cost" strategy and limited activity site location, upper Dry Cimarron River valley, northeastern New Mexico. Ph.D. dissertation. University of Colorado, Department of Anthropology.
- Anderson, Adrian D.
 1975 The Coopertown mammoth: an early man bone quarry. Great Plains Journal, vol. 14, no. 2, pp. 130-173. Lawton, OK.
- Anderson, Duane C.
 1966 The Gordon Creek burial. Southwestern Lore, vol. 32, no. 1, pp. 1-9.
- Anderson, J.
 1976 A techno-functional analysis of the flaked lithic materials from three Woodland period sites on the high plains, southeastern Colorado. MS on file, Department of Anthropology, University of Colorado. Also on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Anonymous
 1961 Newly designated sites: 14BT-404. Kansas Anthropological Association Newsletter, vol. 16, no. 2, pp. 1-3.
- Antevs, Ernest
 1955 Geologic-climatic dating in the west. American Antiquity, vol. 20, pp. 317-332.

- Atkinson, Henry
1826 . . . Expedition up the Missouri: letter from the Secretary of War, transmitting information. . . respecting the movements of the expedition which lately ascended the Missouri River. . . House Doc. [U.S.], 19th Cong., 1st Sess., no. 117. Washington.
- Ayer, Mrs. Edward E., translator
1916 The memorial of Fray de Benevides, 1630. Privately printed. Chicago.
- Baerreis, David A. and Reid A. Bryson
1966 Dating the panhandle aspect cultures. Bulletin of the Oklahoma Anthropological Society, vol. 14, pp. 105-116.
- Baker, Ele M. and Jewell A. Baker
1939 Final report W.P.A. -- west Texas archaeological project 9249. Manuscript on file at Panhandle-Plains Historical Society Museum, Canyon, Texas.
- Baker, Ele M. and Jewell A. Baker
1941a Final report Archaeological Survey -- O.P. 665-66-3-404, State Application 30976. Manuscript on file at Panhandle-Plains Historical Society Museum, Canyon, Texas.
1941b Archaeological excavations of Antelope Creek ruins and Alibates ruins, panhandle aspect, 1938-1941. Ms on file at Panhandle-Plains Historical Museum, Canyon, TX.
- Baker, Galen R.
1964 The archaeology of the park plateau in southeastern Colorado. Southwestern Lore, vol. 30, no. 1, pp. 1-18.
- Baker, William E., Tom N. Campbell, and Glen L. Evans
1957 The Nall site: evidence of early man in the Oklahoma panhandle. Bulletin of the Oklahoma Anthropological Society, vol. 5, pp. 1-20. Oklahoma City.
- Bandelier, Adolph F.
1890 Investigations among the Indians of the southwestern United States, carried on mainly in the years from 1880-1885. Papers of the Archaeological Institute of America, American Series III, part 1. Peabody Museum of American Archaeology and Ethnology, Harvard University, Cambridge.
1892 Final report of investigations among the Indians of the southwestern United States, carried on mainly in the years from 1880-1885. Papers of the Archaeological Institute of America, series IV, part II. Peabody Museum of American Archaeology and Ethnology, Harvard University, Cambridge.
- Bannon, John F., editor
1964 Bolton and the Spanish borderlands. University of Oklahoma Press, Norman.
- Barbour, E.H., and C. Bertrand Schultz
1932 An evaluation of Recent Nebraska finds sometimes attributed to the Pleistocene. Wisconsin Archaeologist, New Series, vol. 13, no. 3, pp. 49-70.
- Barr, Thomas
1966 The Pruitt site: a late plains Woodland manifestation in Murray County, Oklahoma. Oklahoma River Basin Survey, Archaeological Site Report 5.
- Barry, Louise
1972 The beginning of the west, annals of the Kansas gateway to the American west, 1540-1854. Kansas State Historical Society, Topeka.
- Bass, William M.
1962 Human skeletal material from 14LC301 and 14LC302, Lincoln County, Kansas. Kansas State Historical Society. Anthropological Series number 1.
Bass, William M., and Patricia A. Grubbs
1966 Human skeletal material from a Keith focus plains Woodland site, 14PH10, Kirwin Reservoir, Phillips County, Kansas. Plains Anthropologist, vol. 11, no. 32, pp. 135-143. In: The West Island site, 14PH10, a Keith focus plains Woodland site in Kirwin Reservoir, Phillips County, Kansas, Thomas A. Witty, Jr., 1964. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Bass, William M., and Paul Kutsche
1963 A human skeleton from Pueblo County, Colorado. Southwestern Lore, vol. 29, pp. 40-43.
- Bass, W.M., J. McWilliams and B.A. Jones
1967 Archaeological investigations of five sites in Lyon, Jefferson and Phillips counties, Kansas. Transactions of the Kansas Academy of Science, vol. 7, no. 4, pp. 471-478. Topeka.

- Bastian, Tyler
1969 The Hudsonpiller and Freeman sites, northcentral Oklahoma. Oklahoma River Basin Survey, Archaeological Site Report 14.
- Baugh, Timothy G.
1982 Edwards I (34 BK 2): southern plains adaptations in the Protohistoric period. Oklahoma Archaeological Survey, Studies in Oklahoma's Past, no. 8. Norman.
- Beckwith, E.G.
1855 Report of exploration of a route for the Pacific railroad, near the 38th and 39th parallels of latitude, from the mouth of the Kansas to Sevier River in the Great Basin. U.S. War Department Report, 33rd Congress, 1st Session, House Ex. Doc. 129. Washington.
- Beidleman, Richard G.
1958 A partial, annotated bibliography of Colorado ethnology. The Colorado College Studies, Fall, no. 2.
- Bell, Earl H. and Robert E. Cape
1936 The rock shelters of western Nebraska. In Chapters in Nebraska Archeology, edited by Earl H. Bell, vol. 1, no. 5.
- Bell, John R.
1957 The journal of Captain John R. Bell, official journalist for the Stephen H. Long expedition to the Rocky Mountains, 1820. H.M. Fuller and L.R. Hafen, editors, Far West and Rockies Series, vol. VI. Glendale, Calif.
- Bell, Robert E.
1954 Projectile points from west-central Oklahoma: Dan Base Collection. Oklahoma Anthropological Society Bulletin no. 2, pp. 11-18.
1958 Guide to the identification of certain American Indian projectile points. Oklahoma Anthropological Society, Special Bulletin 1.
1960 Guide to the identification of certain American Indian projectile points. Oklahoma Anthropological Society, Special Bulletin 2.
1969 Oklahoma archaeology, an annotated bibliography. University of Oklahoma Press. Norman.
1973 The Washita River focus of the southern plains, in Variations in anthropology: Essays in honor of John C. McGregor, edited by D.W. Lathrap and J. Douglas. Illinois Archaeological Survey, pp. 171-187, Urbana.
- Bell, Robert E. and David E. Baerreis
1951 A survey of Oklahoma archaeology. Bulletin of the Texas Archaeological and Paleontological Society, vol. 22, pp. 7-100.
- Bell, Robert E. and Tyler Bastian
1967a Preliminary report upon excavations at the Longest site, Oklahoma. In: Bell, Jelks and Newcomb 1967: 54-118.
1967b Survey of potential Wichita archeological remains in Oklahoma. In: Bell, Jelks and Newcomb 1967: 119-127.
- Bell, Robert E., Edward B. Jelks and W.W. Newcomb
1967 A pilot study of Wichita Indian archeology and ethnohistory. National Science Foundation, final report.
1974 Wichita Indians: Wichita Indian archaeology and ethnology, a pilot study. Garland Publishing Inc., New York & London.
- Benedict, J.B.
1970a Downslope soil movement in a Colorado alpine region: rates, processes and climatic significance. Arctic and Alpine Research, vol. 2, no. 3, pp. 165-226.
1970b Altithermal occupation of the front range alpine region. Abstracts, First Meeting American Quaternary Association, Bozeman: 8.
1974 Prehistoric man and environment in the Colorado front range: fieldwork during the summer of 1974. MS to U.S. Forest Service and Smithsonian Institution.
1975a The Murray site: a late prehistoric game drive system in the Colorado Rocky Mountains. Plains Anthropologist, vol. 20, no. 69, pp. 161-174.
1975b Scratching Deer: a late prehistoric campsite in the Green Lakes valley, Colorado. Plains Anthropologist, vol. 20, no. 70, pp. 267-278.
1975c The Albion Boardinghouse site: archaic occupation of a high mountain valley. Southwestern Lore, vol. 41, no. 3, pp. 1-12.

- 1978a Excavations at the Hungry Whistler site. In *The Mount Albion complex: a study of prehistoric man and the altithermal*. Center for Mountain Archeology, Research Report no. 1, James B. Benedict and Byron L. Olson, pp. 1-75.
- 1978b *The Mount Albion complex: review and summary*. In *The Mount Albion complex: a study of prehistoric man and the altithermal*, James B. Benedict and Byron L. Olson. Center for Mountain Archeology, Research Report no. 1, pp. 118-138.
- Benedict, J.B.
- 1978c *The Mount Albion complex and the altithermal*. In *The Mount Albion complex: a study of prehistoric man and the altithermal*, James B. Benedict and Byron L. Olson. Center for Mountain Archeology, Research Report no. 1, pp. 139-180.
- 1978d *Getting away from it all: a study of man, mountains, and the two-drought altithermal*. Paper prepared for Symposium on Colorado Archeology, Plains Anthropological Association, 36th annual meeting, Denver.
- 1979a *Getting away from it all: A study of man, mountains, and the two-drought altithermal*. *Southwestern Lore*, vol. 45, no. 3, pp. 1-12.
- 1979b *Excavations at the Blue Lake Valley site, front range, Colorado*. *Southwestern Lore*, vol. 45, no. 4, pp. 7-17.
- Benedict, James B. and Byron L. Olson
- 1973 *Origins of the McKean complex: evidence from timberline*. *Plains Anthropologist*, vol. 18, no. 62, pp. 323-327. Reprint on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 *The Mount Albion complex: a study of prehistoric man and the altithermal*. Center for Mountain Archeology, Research Report no. 1.
- Berthrong, Donald J.
- 1963 *The southern Cheyennes*. University of Oklahoma Press, Norman.
- Birmingham, William W. and Thomas R. Hester
- 1976 *Late Pleistocene archaeological remains from the Johnston-Heller site, Texas coastal plain*. In: *Papers on Paleo-Indian archaeology in Texas*. Center for Archaeological Research, University of Texas at San Antonio, Special Report, vol. 3, pp. 15-33.
- Black, Craig C., editor
- 1974 *History and prehistory of the Lubbock Lake site*. *The Museum Journal* 15. Lubbock: West Texas Museum Association.
- Blaine, Jay C.
- 1968 *A preliminary report of an early man site in west Texas*. *Transactions of the Third Regional Archaeological Symposium for Southeastern New Mexico and Western Texas*, pp. 1-11. South Plains Archaeological Society, Lubbock.
- Blaine, Jay C., R.K. Harris, Wilson W. Crook, Jr., and Joel Shiner
- 1968 *The Acton site: Hood County, Texas*. *Bulletin of the Texas Archaeological Society*, vol. 30, pp. 45-94. Dallas.
- Blasingham, Emily J.
- 1963 *Appraisal of the archaeological resources of the Norton Reservoir, Norton County, Kansas*. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Bliss, Wesley L.
- 1950 *Early and late lithic horizons in the plains*. *Proceedings of the Sixth Plains Archeological Conference (1948)*, edited by Jesse D. Jennings. University of Utah Publications in Anthropology, vol. 11, pp. 108-116.
- Bolton, Herbert E.
- 1913 *New light on Manuel Lisa and the Spanish fur trade*. *Southwestern Historical Quarterly*, Texas State Historical Association, vol. XVII, no. 1, pp. 61-66.
- 1913b *Guide to the material for the history of the United States in the principal archives of Mexico*. Carnegie Institution of Washington Publication 163.
- Bolton, Herbert E.
- 1914 *Athanase de Mezieres and the Louisiana-Texas frontier 1768-1780*, 2 volumes. The Arthur H. Clark Company, Cleveland.
- 1915 *Texas in the middle eighteenth century*. In: *University of California Publications in History*, vol. III, H.M. Stephens and H.E. Bolton, editors, Berkeley.
- 1917 *Archaeological sites in Custer County, Oklahoma*. *Bulletin of the Texas Archeological and Paleontological Society*, vol. 22, pp. 164-187, Lubbock, TX.
- Broecker, W.S. and J.L. Kulp
- 1957 *Lamant natural radiocarbon measurements IV*. *Science*, vol. 126, no. 3287, pp. 240-247.

- Broilo, Frank
1971 An investigation of surface collected Clovis, Folsom, and Midland projectile points from Blackwater Draw and adjacent localities. Unpublished Master's Thesis, Department of Anthropology, Eastern New Mexico University, Portales.
- Brown, Kenneth
1976 Prehistoric cultural resources of the Cimarron National Grassland, Morton and Stevens counties, Kansas. Report submitted to U.S.D.A., Forest Service, Cimarron National Grassland District, Elkhart, Kansas.
- Brugge, David M.
1965 Some plains Indians in the church records of New Mexico. *Plains Anthropologist*, vol. 10, no. 29, pp. 181-189.
- Brugge, David M.
1968 Navajos in the Catholic church records of New Mexico 1694-1875. The Navajo Tribe, Parks and Recreation Department, Research Report no. 1. Window Rock.
1979 Navajo prehistory and history to 1850. Volume 10. *Handbook of North American Indians* (William C. Sturtevant, General Ed.).
- Bryan, Francis T.
1857 Exploration from Fort Riley to Bridger's Pass. In House Ex. Doc. 35 Cong., 1st Sess., no. 2, pp. 455-520, Washington.
- Bryan, K. and L.L. Ray
1940 Geologic antiquity of the Lindenmeier site in Colorado. *Smithsonian Miscellaneous Collections*, vol. 99, no. 2.
- Bryan, Kirk
1950 Flint quarries-- the source of tools and, at the same time, the factories of the American Indian. *Papers of the Peabody Museum of the American Archaeology and Ethnology*, vol. 17, no. 3.
- Bryson, Reid A., David A. Baerreis, and Wayne M. Wendland
1970 The character of late-glacial and post-glacial climatic changes. In: *Pleistocene and Recent environments of the central Great Plains*. Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publication 3, pp. 53-74.
- Buck, Arthur Dewey, Jr.
1959 The Custer focus of the southern plains. *Bulletin of the Oklahoma Anthropological Society*, vol. 7, pp. 1-31. Oklahoma City.
- Buckles, William G., G.H. Ewing, Nancy Buckles, G.J. Armelagos, J.J. Wood, J.D. Haug and J.H. McCullough
1963 The excavations of the Hazeltine Heights site. *Southwestern Lore*, vol. 29, no. 1, pp. 1-36.
- Burton, Robert J. and Susan S. Burton
1971 An archeological survey of the Lake Altus shoreline, Greer and Kiowa counties. *Oklahoma River Basin Survey, General Survey Report no. 12*, Norman.
- Bushnell, David I., Jr.
1922 Villages of the Algonquian, Siouan, and Caddoan tribes west of the Mississippi. *Smithsonian Institution, Bureau of American Ethnology, Bulletin 77*.
- Butler, P.M. and G.G. Lewis
1846 Report of Messrs. Butler & Lewis, Commissioners to treat with the Camanchers and other prairie Indians, under instructions from the War Department. Washington.
- Butler, William B.
1980 Comments on a research design for the state historic preservation plan: eastern Colorado. Paper presented at the March 1980 meeting of the Colorado Council of Professional Archeologists in a Symposium on Research Design and State Historic Preservation Plan.
- Campbell, Robert G.
1976 The Panhandle aspect of the Chaquagua plateau. *Texas Tech University Graduate Studies* no. 11.
Campbell, T.N.
1960 Texas archeology: a guide to the literature. *Bulletin of the Texas Archeological Society*, vol. 29, pp. 177-254.
- Carleton, J. Henry
1943 The prairie logbooks, dragoon campaigns to the Pawnee villages in 1844, and to the Rocky Mountains in 1845. (Originally published anonymously in *Spirit of the Times*, New York, 1844-1846). The Claxton Club, Chicago.

- Carlson, G.F.
1971 A local sequence for Upper Republican sites in the Glen Elder Reservoir locality, Kansas. Unpublished M.A. Thesis, Department of Anthropology, University of Nebraska.
- Carlson, Gayle F., and Terry L. Steinacher
1978 A preliminary culture-historical sequence for the Plains Archaic period in Nebraska. Paper presented at the Symposium "Migration and Extinction in the Great Plains", Institute for Tertiary-Quaternary Studies, Lincoln, Nebraska.
- Carlson, Roy L.
1965 Eighteenth century Navajo fortresses of the Gobernador District. University of Colorado Studies, Series in Anthropology 10. Boulder.
- Carroll, H.B. and J.V. Haggard
1942 Three New Mexico chronicles. Quivira Society Publication no. 11.
- Carroll, John M.
1973 The Sand Creek massacre: a documentary history. New York.
- Carter, Dick
1959 A catalog of Indian artifact collectors in the Golden Spread. Norpan Archeological Society.
- Champe, John L.
1936 The Sweetwater culture complex. In Chapters in Nebraska Archaeology, edited by Earl H. Bell, vol. 1, no. 3, pp. 249-297. Lincoln.
1946 Ash Hollow Cave: a study of stratigraphic sequence in the central Great Plains. University of Nebraska Studies, New Series, no. 1, 1949 White Cat village. American Antiquity, vol. 14, no. 4, pp. 285-292.
- Chavez, Fray Angelico
1950 Some original New Mexico documents in California libraries. New Mexico Historical Review vol. 25, pp. 244-253.
- Cheney, Nadine
1977 Report and summary of site 14GL417, Greeley County, Kansas. Kansas Anthropological Association Newsletter, vol. 22, no. 8.
- Chronic, John
1964 Geologic history and fossil record of the Boulder area. In: Natural History of the Boulder area, Hugo Rodeck, ed. University of Colorado Museum, Boulder. Leaflet 13, pp. 9-24.
- Chronic, John and Halka Chronic
1972 Prairie, peak and plateau: a guide to the geology of Colorado. Colorado Geological Survey Bulletin 32.
- Chubbuck, Jerry
1959 The discovery and exploration of the Olsen-Chubbuck site (CH-3). Southwestern Lore, vol. 25, no. 1, pp. 4-10.
- Clark, S.J.V., P.J. Webber, V. Komarkova and W.A. Weber
n.d. Map of mixed prairie grassland vegetation, Rocky Flats, Colorado. Unpublished manuscript on file at University of Colorado, INSTAR.
- Clark, Tim W.
1969 Some petroglyphs from the Black Mesa area of Cimarron County, Oklahoma. Proceedings of the Oklahoma Academy of Sciences, 138-141.
- Clements, Forest E.
1945 Historical sketches of Spiro Mound. Contributions from the Museum of the American Indian, Heye Foundation, vol. 14, pp. 48-68.
- Clements, Frederick E. and Edith S. Clements
1928 Rocky Mountain Flowers. H.W. Wilson Company, New York.
- Clements, F.E., and R.W. Chaney
1937 Environment and life in the Great Plains. Carnegie Institution of Washington Supplementary Publications, no. 24 (rev. ed.).
- Clements, Frederick E.
1938 Climatic cycles and human populations in the Great Plains. Scientific Monthly, vol. XLVII, no. 3, pp. 193-210.
- Clisby, K.H. and P.B. Sears
1956 San Augustine Plains-Pleistocene climatic changes. Science, vol. 124, pp. 537-539. Washington.

- Collins, Michael B.
 1968 A note on broad corner-notched projectile points used in bison hunting in western Texas. *The Bull Roarer*, Newsletter of the University of Texas Anthropological Society, vol. 3, no. 2, pp. 13-14, Austin.
 1971 A review of Llano Estacado archaeology and ethnohistory. *Plains Anthropologist*, vol. 16, no. 52, pp. 85-104.
- Cook, H.J.
 1927 New geological and paleontological evidence bearing on the antiquity of mankind in America. *Natural History*, vol. 7, no. 3, pp. 240-247. New York.
- Cooper, Paul A.
 1936 Archaeology of certain sites in Cedar County, Nebraska. In *Chapters in Nebraska Archaeology*, edited by Earl H. Bell, vol. 1, no. 1, pp. 11-146. Lincoln.
- Cooper, Paul L.
 1955 The archeological and paleontological salvage program in the Missouri Basin, 1950-1951. *Smithsonian Miscellaneous Collections*, vol. 126, no. 2.
- Cordell, Linda S.
 1978 A cultural resources overview of the middle Rio Grande valley, New Mexico. For Albuquerque District Bureau of Land Management, Carson National Forest, Cibola National Forest, Santa Fe National Forest. U.S.D.A. Forest Service.
- Cotter, John Lambert
 1937a The occurrence of flints and extinct animals in pluvial deposits near Clovis, New Mexico, pt. IV. Report on the excavations at the gravel pit in 1936. *Proceedings Philadelphia Academy Natural Sciences*, vol. 89, pp. 2-16.
 1937b The significance of Folsom and Yuma artifact occurrences in the light of typology and distribution. *Twenty-fifth Anniversary Studies, Philadelphia Anthropological Society*, vol. 1, pp. 22-35.
 1938 The occurrence of flints and extinct animals in pluvial deposits near Clovis, New Mexico, pt. VI. Report on field season of 1937. *Proceedings Philadelphia Academy Natural Sciences*, vol. 90, pp. 113-117.
- Coues, Elliott, editor
 1895 *The expedition of Zebulon Montgomery Pike to headwaters of the Mississippi River, through Louisiana Territory and New Spain, during the years 1805-6-7*. New York.
 1965 *History of the expedition under the command of Lewis and Clark in three volumes*. (Republication of the Francis P. Harper 1893 edition). Dover Publications, Inc. New York.
 1970 *The journal of Jacob Fowler*. University of Nebraska Press, Lincoln.
- Crane, H.R. and James B. Griffin
 1968 University of Michigan radiocarbon dates XII. *Radiocarbon*, vol. 10, no. 1, pp. 61-114.
- Cummings, Thomas S.
 1953 A preliminary report on the Blue Stone focus, White Rock aspect. Abstract. In: *Proceedings of the Nebraska Academy of Sciences*, May 1.
- Cutler, Hugh C., and Leonard W. Blake
 1969 Corn. In: *Two house sites in the central plains: an experiment in archaeology*, edited by W. Raymond Wood. *Plains Anthropologist*, vol. 14, no. 44, pt. 2, pp. 61-62.
- Daifuku, Hiroshi
 1952 A new conceptual scheme for prehistoric cultures in the southwestern United States. *American Anthropologist*, vol. 54, no. 2, pp. 199-200.
- Damon, P.E., C.W. Ferguson, A. Long, and E.I. Wallick
 1974 Dendrochronologic calibration of the radiocarbon time scale. *American Antiquity*, vol. 39, pp. 350-356.
- Davis, E. Mott
 1953a Recent data from two Paleo-Indian sites on Medicine Creek, Nebraska. *American Antiquity*, vol. 18, no. 4, pp. 380-386.
 1953b Report of investigations by the University of Nebraska State Museum in the Medicine Creek Reservoir area in 1952. Report on file. National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1962 Archeology of the Lime Creek site in southwestern Nebraska. University of Nebraska State Museum Special Publication no. 3.
- Davis, William A.
 1962 Appraisal of the archaeological resources of Sanford Reservoir, Hutchinson, Moore, and Potter counties, Texas. Manuscript on file, Southwestern Regional Office, National Park Service, Santa Fe.

- Deevey, Edward S., Richard Foster Flint, and Irving Rouse, editors
 1967 Radiocarbon, volume 9. American Journal of Science, Yale University, New Haven, Conn.
- Dibble, David S.
 1968 The archaeology. In: David S. Dibble and Dessamae Lorrain, Bonfire Shelter: a stratified bison kill site, Val Verde County, Texas. Texas Memorial Museum Miscellaneous Papers, vol. 1, pp. 1-76.
 1970 On the significance of additional radiocarbon dates from Bonfire Shelter, Texas. Plains Anthropologist, vol. 15, no. 50, pp. 251-254.
- Dibble, David and Dessamae Lorrain
 1968 Bonfire Shelter: a stratified bison kill site, Val Verde County, Texas. Texas Memorial Museum Miscellaneous Papers, vol. 1.
- Dick, Herbert
 1953 The status of Colorado archaeology, with a bibliographic guide. Southwestern Lore, vol. 18, pp. 53-77.
 1974 The Running Pit House site. In: Trinidad Reservoir salvage archaeology, 1972 by Stephen K. Ireland, pp. 163-177. On file, National Park Service, Midwest Archeological Center, Lincoln.
- Dick, Herbert W. and Bert Mountain
 1960 The Claypool site: a Cody complex site in northeastern Colorado. American Antiquity, vol. 26, pp. 223-235. Salt Lake City.
- Dillehay, Tom D.
 1974 Late Quaternary bison population changes on the southern plains. Plains Anthropologist, vol. 19, pp. 180-196.
- Dittert, A.E., Jr., F.W. Eddy, and B.L. Dickey
 1963 Evidences of early ceramic phases in the Navaho Reservoir district. El Palacio, vol. 70, pp. 2-9.
- Dodge, Henry
 1834 [Journal of Colonel Dodge's expedition from Fort Gibson to the Pawnee Pict Village.] Senate Doc., 23rd Cong, 2nd Sess. no. 1. Washington.
 1836 . . . Colonel Dodge's journal . . . report to the Secretary of War. . . transmitting a report of the expedition of the Dragoons, under the command of Colonel Henry Dodge, to the Rocky Mountains during the summer of 1835. House Doc. [U.S.] 24th Cong., 1st Sess.; no. 181. Washington.
- Douglas, F.H.
 1932 The grass house of the Wichita and Caddo. Denver Art Museum, Indian Leaflet Series, no. 42, pp. 1-4.
- Downing, Barbara J.
 1981 A reappraisal of old archaeological collections: the Renaud collection. M.A. Thesis, University of Denver.
- Duffield, Lathal F.
 1953 The Brewer site: a preliminary report. Bulletin of the Oklahoma Anthropological Society, vol. 1, pp. 61-68.
 1965 The Taovayas village of 1759: in Texas or Oklahoma? Great Plains Journal, vol. 4, no. 2, pp. 39-48. Lawton.
- Du Lac, Perrin
 1807 Travels through the two Louisianas, 1801, 1802, 1803. London.
- Dunbar, John B.
 1835 Extracts from the journal of Mr. Dunbar. The Missionary Herald for 1835, vol. 31, pp. 343-349, 376-381, 417-421.
 1880 The Pawnee Indians: their history and ethnology. Magazine of American History, vol. 4, no. 4, pp. 241-281.
- Dunbar, John B.
 1911 Missionary life among the Pawnee. Collections of the Nebraska State Historical Society, vol. XVI, pp. 268-287. Albert Watkins, editor.
- Dunlevy, Marion Lucile
 1936 A comparison of the cultural manifestations of the Burkett (Nance County) and the Gray-Wolfe (Colfax County) sites. In Chapters in Nebraska Archaeology, edited by Earl H. Bell, vol. 1, no. 2, pp. 147-248. The University of Nebraska. Lincoln.

- Eighmy, Jeff
1970 Edwards II: report of an excavation in western Oklahoma. *Plains Anthropologist*, vol. 15, no. 50, pt. 1, pp. 255-281.
- Ekirch, Arthur A., Jr.
1974 Cheyenne and Arapaho Indians. *American Indian Ethnohistory*, Plains Indians, Arapaho-Cheyenne Indians. Garland Publishing Co. New York and London.
- Ellzey, Tom S.
1966 A panhandle aspect site (preliminary report). *Midland Archaeological Society Special Bulletin* no. 1, pp. 59-65. Handley Ruins.
- Emory, W.H.
1848 Notes of a military reconnaissance from Fort Leavenworth, in Missouri to San Diego, in California, including part of the Arkansas, Del Norte, and Gila rivers. Senate Ex. Doc. 30th Cong. 1st Sess.; no. 7.
- Espinosa, J. Manuel
1942 Crusaders of the Rio Grande. Institute of Jesuit History Publications. Chicago.
- Evans, Glen L.
1951 Prehistoric wells in eastern New Mexico. *American Antiquity*, vol. 17, no. 1, pt. 1, pp. 1-8.
- Ewers, John C.
1958 The Blackfeet: raiders of the northwestern plains. University of Oklahoma Press, Norman.
- Ewers, John C., and Stuart Cuthbertson
1939 A preliminary bibliography on the American fur trade. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Eyerly, T.L.
1907a Archaeological work in the Texas panhandle. *Bulletin of the Texas Academy* (not examined).
1907b The buried city of the panhandle. *Transactions of Kansas Academy of Science*, vol. 21, pt. 1, pp. 219-228.
1907c The Wolf Creek expedition. *The Student*, vol. 2.
1910 The Indian remains of the Canadian River valley. *The Archaeological Bulletin*, vol. 1, no. 3, Hico, Texas, pp. 77-80.
- Falk, Carl R.
1969 The faunal evidence. In Wood 1969: *Plains Anthropologist*, vol. 14, no. 44, p. 102.
- Field, Mathew C.
1957 Prairie and mountain sketches. Edited by K. Gregg and J. McDermott. University of Oklahoma Press, Norman.
1960 Matt Field on the Santa Fe trail. John E. Sunder, editor. University of Oklahoma Press, Norman.
- Figgins, Jesse D.
1927 The antiquity of man in America. *Natural History*, vol. 27, no. 3, pp. 220-239.
1933 A further contribution to the antiquity of man in America. *Proceedings Colorado Museum Natural History*, vol. 12, no. 2.
- Finnegan, Michael
1974 The human skeleton from feature 2, site 14TO301, Trego County, Kansas. MS, Report to the State Archaeologist, Topeka.
1976 Archaic human skeletal material from the Draper Cave site, 5CR1, Custer County, Colorado. *Southwestern Lore*, vol. 42, no. 3, pp. 24-32.
1981 Archaic skeletal remains from the central plains: demography and burial practices. In: *Progress in skeletal biology of plains populations*. R.L. Jantz and D.H. Ubelaker, eds. *Plains Anthropologist*, Memoir 17, pp. 85-92.
n.d. Analysis of the human skeletal material from site 5JF211, Jefferson County, Colorado. Unpublished Report of the Denver Chapter of the Colorado Archaeological Society.
- Finnegan, Michael and Tom Witty
1977 A seated burial and associated boatstone from northwestern Kansas. *Plains Anthropologist*, vol. 22, no. 75, pp. 23-35.
- Fisher, William (compiler)
1812 New travels among the Indians of North America: being a compilation, taken partly from the communications already published, of Captains Lewis and Clark, to the President of the United States, and partly from other authors who travelled among various tribes of Indians. . . Philadelphia.

- Fitzgerald, James E.
1849 An examination of the character and proceedings of the Hudson's Bay Company, with reference to the grant of Vancouver's Island. London.
- Fitzpatrick, Thomas
1848 [Report, as Indian Agent to the Superintendent of Indian Affairs.] In U.S. President 1845-1849 (Polk). Message Dec. 7, 1847 Appendix, pp. 237-249. Washington. Also: Senate Exec. Doc. U.S. 30th Cong., 1st Sess., no. 1, Serial 503, pp. 237-249.
- Flayharty, R.A. and Elizabeth Ann Morris
1974 T-W-Diamond, a stone ring site in northern Colorado. *Plains Anthropologist*, vol. 19, no. 65, pp. 161-172.
- Fletcher, Alice C.
1907 Grass houses. In *Handbook of American Indians*, Bulletin 30, Bureau of American Ethnology, pt. 1. Washington.
- Folmer, Henri
1939 The Mallet expedition of 1739 through Nebraska, Kansas and Colorado to Santa Fe. *The Colorado Magazine*, vol. XVI (September) pp. 1-13.
1939 French expansion towards New Mexico in the eighteenth century. Unpublished M.A. Thesis, University of Denver.
1953 Franco-Spanish rivalry in North America. *Spain in the West*, vol. VII. Arthur H. Clark Co., Glendale, California.
- Forbes, Jack D.
1960 Apache, Navajo and Spaniard. University of Oklahoma Press, Norman.
- Forbis, Richard G. and John D. Sperry
1952 An early man site in Montana. *American Antiquity*, vol. 18, pp. 127-133.
- Foreman, Grant
1926 Pioneer days in the early southwest. Arthur H. Clark Co., Cleveland.
1933 Advancing the frontier, 1830-1860. University of Oklahoma Press, Norman.
- Foreman, Grant (editor)
1937 Adventure on Red River. Report of the exploration of the headwaters of the Red River by Captain Randolph B. Marcy and Captain G.B. McClellan. University of Oklahoma Press, Norman.
- Fremont, John C.
1843 A report of an exploration of the country lying between the Missouri River and the Rocky Mountains on the line of the Kansas and Great Platte rivers. . .U.S. 27th Cong., 3rd Sess., Senate Doc. 243. Washington.
1845 Report of the exploring expedition to the Rocky Mountains in the year 1842 and to Oregon and north California in the years 1843-1844. U.S. 28th Cong., 2nd Sess., Senate Ex. Doc. 174. Washington.
1887 Memoirs of my life. Including in the narrative five journeys of western exploration, during the years 1842, 1843-44, 1845-46-47, 1848-49, 1853-54. Chicago and New York.
- Frison, George C.
1967 The Piney Creek sites, Wyoming (48 JO 311 and 312). University of Wyoming Publications, vol. 33, no. 1, pp. 1-92.
1970 The Kobold site, 24BH406: a post-alithermal record of buffalo-jumping for the northwestern plains. *Plains Anthropologist*, vol. 15, no. 47, pp. 1-35.
1971 Shoshonean antelope procurement in the upper Green River basin, Wyoming. *Plains Anthropologist*, vol. 16, no. 54, pt. 1, pp. 258-284.
- Frison, George C., editor
1974a The Casper site, a Hell Gap bison kill on the high plains. Academic Press, New York.
- Frison, George C., editor
1974b The archeology of the Casper site. In: *The Casper site: a Hell Gap bison kill on the high plains*. G. Frison, ed. New York: Academic Press.
1974c Concluding summary. In: *The Casper site: a Hell Gap bison kill on the high plains*, edited by George C. Frison, pp. 241-243.
- Frison, George C., and Michael Wilson
1975 An introduction to Bighorn Basin archaeology. Twenty-seventh Annual Field Conference, 1975 Wyoming Geological Association Guidebook, vol. 19, no. 35.
- Frison, G.C., editor
1976 Cultural activity associated with prehistoric mammoth butchering and processing. *Science*, vol. 194, pp. 728-730.

- Frison, G.C.
1978 Prehistoric hunters of the high plains. Academic Press, New York.
- Frison, George C. and George M. Zeimens
1980 Bone projectile points: an addition to the Folsom cultural complex. *American Antiquity*, vol. 45, no. 2, pp. 231-237.
- Frost, Lawrence
1960 Battle of the Washita. In: *Great western Indian fights by members of the Potomac Corral of the Westerners*, pp. 175-181. Garden City, N.Y.
- Fuller, H.M. and L.R. Hafen, editors
1957 *The journal of Captain John R. Bell. . . 1820. The Far West and Rockies Series*, vol. VI, Glendale, California.
- Galinat, Walton C.
1959 Plant remains from the LoDaisKa site. In: *Excavations at the LoDaisKa site in the Denver, Colorado area by H.J. and C.C. Irwin. The Denver Museum of Natural History, Proceedings* no. 8, pp. 104-113.
- Galinat, Walton C. and James H. Gunnerson
1963 Spread of eight-rowed maize from the prehistoric southwest. *Botanical Museum Leaflets, Harvard University* vol. 20, no. 5, pp. 117-160.
- Gallaher, Art
1951 The Goodman I site, Custer County, Oklahoma. *Bulletin of the Texas Archeological and Paleontological Society*, vol. 22, pp. 188-216, Lubbock, TX.
- Gardner, Hamilton
1963 Philip St. George Cooke and the Apache, 1854. *New Mexico Historical Review*, vol. 28, pp. 115-132.
- Ghent, W.J.
1936 *The early far west, a narrative outline*. Tudor Publishing Co., New York.
- Gilbert, Claudette Marie
1979 Mammoth hunters: the Domebo site. *Prehistoric Peoples of Oklahoma* no. 4, The University of Oklahoma Stovall Museum of Science and History and Oklahoma Archeological Survey, Norman.
- Gilder, Robert F.
1926 *The Nebraska culture man*. Omaha: Henry F. Kieser.
- Gillio, David A.
1971 Ceramics. In: *Archaeological investigations at the Wilbur Thomas shelter, Carr, Colorado*, assembled and edited by David A. Breternitz. *Southwestern Lore*, vol. 36, no. 4, pp. 83-84.
- Glassow, Michael A.
1972 The evolution of early agricultural facilities systems in the northern southwest. Unpublished PhD dissertation, Department of Anthropology, University of California, Los Angeles.
- Glassow, Michael A.
1980 Prehistoric agricultural development in the northern southwest; a study in changing patterns of land use. *Ballena Press Anthropological Papers*, no. 16. New Mexico.
- Goddard, Pliny E.
1911 Jicarilla Apache texts. *American Museum of Natural History Anthropological Papers* 8.
- Gooding, John (editor)
1980a The Bayou Gulch site (5 DA 265). Colorado State Highway Department. *Highway Salvage Report* no. 22.
- Grange, Roger T., Jr.
1968 Pawnee and lower Loup pottery. *Nebraska State Historical Society, Publications in Anthropology*, no. 3, Lincoln.
1979 An archeological view of Pawnee origins. *Nebraska History*, vol. 60, no. 2, pp. 134-160.
1980 Salvage archeology in the Red Willow Reservoir, Nebraska. *Nebraska State Historical Society, Publications in Anthropology*, no. 9.
- Grant, Blanche C.
1934 *When old trails were new, the story of Taos*. The Press of the Pioneers, New York.
- Graves, O.L. and Robert Button
1964 Archeological investigations of site 14BT420, Barton County, Kansas. *Kansas Anthropological Association Newsletter*, vol. 9, no. 7.

- Green, F.E.
 1962 The Lubbock Reservoir site. *The Museum Journal*, vol. 6, pp. 83-123.
 1967 Archaeological salvage in the Sanford Reservoir area. Manuscript on file at Southwestern Regional Center National Park Service, Santa Fe. (Footprint, Arrowhead Peak, MO-7, PT-8).
- Green, F.E. and J.H. Kelley
 1960 Comments on Alibates flint. *American Antiquity*, vol. 25, no. 3, pp. 413-414.
- Green, Joe H.
 1955 Some flint caches, the Alibates quarry, and a stone pestle. *Panhandle-Plains Historical Review*, vol. 28, pp. 78-81, Canyon, TX.
- Greer, John W.
 1965 A typology of midden circles and mescal pits. *Southwestern Lore*, vol. 31, no. 3, pp. 41-55.
 1966 The Loudon site (CO-1), Las Animas County, Colorado. *Southwestern Lore*, vol. 32, no. 3, pp. 57-65.
- Greiser, Sally Thompson
 1977 Micro-analysis of wear-patterns on projectile points and knives from the Jurgens site, Kersey, Colorado. *Plains Anthropologist*, vol. 22, no. 76, pt. 1, pp. 107-116.
- Grinnell, G.B.
 1915 The fighting Cheyennes. New York.
 1956 The fighting Cheyennes. (Published in 1915 by Charles Scribner's Sons.) University of Oklahoma Press, Norman.
- Guffee, Eddie, and Jack T. Hughes
 1974 An archeological survey in the Running Water Draw watershed, report submitted to the Soil Conservation Service by the Archeological Research Laboratory, Killgore Research Center, West Texas State University, Canyon.
- Gunnerson, D.
 1956 The southern Athabascans: their arrival in the southwest. *El Palacio*, vol. 63, nos. 11-12, pp. 346-365.
- Gunnerson, D.
 1972 Man and bison on the plains in the Protohistoric period. *Plains Anthropologist*, vol. 17, no. 55, pp. 1-1-.
 1974 The Jicarilla Apaches: a study in survival. Northern Illinois University Press, DeKalb.
- Gunnerson, Dolores A.
 1984a Indian "Nations of the North" on the New Mexico Spanish frontier. Paper presented at the 1984 Nebraska Academy of Sciences. Lincoln.
 1984b Padoucas: Apaches of the Paddocks. Paper presented at the annual meeting of the New Mexico Archeological Council, Cimarron. New Mexico.
- Gunnerson, James H.
 1959 Archaeological survey in northeastern New Mexico. *El Palacio*, vol. 66, no. 5, pp. 145-154. Santa Fe.
 1960 An introduction to Plains Apache archeology--the Dismal River aspect. *Anthropological Paper No. 58*, Smithsonian Institution, Bureau of American Ehtnology, Bulletin 173, pp. 129-260. Washington.
 1968 Plains Apache archeology: a review. *Plains Anthropologist*, vol. 13, no. 41, pp. 167-189.
 1969a A human skeleton from an Apache baking pit. *Plains Anthropologist*, vol. 14, no. 43, pp. 46-56.
 1969b Apache archeology in northeastern New Mexico. *American Antiquity*, vol. 34, no. 1, pp. 23-39.
 1973 Field notes.
 1979 Southern Athapaskan archeology. In: *Handbook of North American Indians*, vol. 9, pp. 162-169. Smithsonian Institution, Washington, D.C.
- Gunnerson, James H.
 1984 Documentary clues and northeastern New Mexico archeology. Paper presented at the 1984 annual meeting of the New Mexico Archeological Conference (in press).
- Gunnerson, James H. and Dolores A. Gunnerson
 1970 Evidence of Apaches at Pecos. *El Palacio*, vol. 76, pp. 1-6.
 1971 Apachean culture: a study in unity and diversity. In: *Apachean culture history and ethnology*, Keith H. Basso and Morris E. Opler, eds., pp. 7-27. Tucson: Anthropological Papers of the University of Arizona 21.

- Gussow, Zachary
1974 Cheyenne and Arapaho aboriginal occupation. In: American Indian ethnohistory, plains Indians, Arapaho-Cheyenne Indians. New York and London.
- Hack, John T.
1943 Antiquity of the Finley site. American Antiquity, vol. 8, no. 3, pp. 235-241.
- Hackett, Charles W., ed. and trans.
1923- Historical documents relating to New Mexico, Nueva Vizcaya and approaches thereto, to
1937 1773, 3 vols. Carnegie Institution of Washington Publication 330. Washington.
- Hackett, Charles W., editor
1934- Pichardo's Treatise on the limits of Louisiana and Texas. 4 vols. University of Texas
1946 Press, Austin.
- Hafen, LeRoy R. and Ann W. Hafen (editors)
1955- Relations with the Indians of the plains, 1857-1861. The Far West and the Rockies Historical
1961 Series, vol. IX. Arthur H. Clark Co. Glendale, California.
- Hafen, LeRoy R. (editor)
1966 The mountain men and the fur trade of the far west. 8 vols. Glendale, California.
- Hafen, LeRoy R.
1974 Historical development of the Arapaho-Cheyenne land area. American Indian ethnohistory. Plains Indians, Arapaho-Cheyenne Indians. New York and London.
1981 Broken Hand: the life of Thomas Fitzpatrick, mountain man, guide and Indian agent. (Reprint of 1931 publication). University of Nebraska Press, Lincoln.
- Hagar, Ivor K.
1976 5CR1 - Draper Cave excavation and research report. Southwestern Lore, vol. 42, no. 3, pp. 1-13.
- Hale, Kenneth
1958 Internal diversity in Uto-Aztecan: I. International Journal of American Linguistics, vol. 24, no. 2, pp. 101-107.
- Hammack, Laurens C.
1965 Archaeology of the Ute dam and reservoir. Papers in Anthropology, no. 14. Museum of New Mexico Press. Santa Fe.
- Hammatt, Hallett H.
1976 The Gore Pit site: an archaic occupation in southwestern Oklahoma and a review of the archaic stage in the southern plains. Plains Anthropologist, vol. 21, no. 74, pp. 245-277. Lincoln.
- Hammond, George P. and Agapito Rey
1928 Obregons history of the 16th century explorations in western America. Wetzel Publishing Co. Inc., Los Angeles.
1940 Narratives of the Coronado expedition, 1540-1542. Coronado Historical Series, vol. 2. University of New Mexico.
- Hammond, George P. and Agapito Rey
1953 Don Juan de Onate colonizer of New Mexico 1595-1628. 2 vols. Albuquerque: University of New Mexico Press.
1966 The rediscovery of New Mexico, 1580-1594. University of New Mexico Press, Albuquerque.
- Harlow, Francis H.
1970 Historic Pueblo Indian pottery: painted jars and bowls of the period 1600-1900. Santa Fe: Museum of New Mexico Press.
- Harrington, C.R., R. Bonnicksen, and R.E. Morlan
1975 Bones say man lived in Yukon 27,000 years ago. Canadian Geographical Journal, vol. 91, pp. 42-48.
- Harrington, J.P.
1940 Southern peripheral Athapaskawan origins, divisions, and migrations. Smithsonian Miscellaneous Collections, vol. 100, pp. 503-532.
- Harrison, Billy R.
in Untitled--a report on the Blue Spring shelter in Palo Duro Canyon in Randall County,
prep Texas.
- Harrison, Billy R., and Kay L. Killen
1978 Lake Theo: a stratified early man bison butchering and camp site, Briscoe County, Texas. Panhandle-Plains Historical Museum, Special Archeological Report No. 1. Canyon, Texas.
- Hartley, John D.
1974 The Von Elm site: an early plains Woodland complex in northcentral Oklahoma. Oklahoma River Basin Survey, Archaeological Site Report 28. Norman.

- Hartley, John D. and A.F. Miller
1977 Archaeological investigations at the Bryson-Paddock site, an early contact period site on the southern plains. Oklahoma River Basin Survey, Archaeological Site Report No. 32. Norman.
- Haury, E.W.
1950 The stratigraphy and archaeology of Ventana Cave, Arizona. University of Arizona, University of New Mexico Presses. Tucson and Albuquerque.
- Haynes, C.V., Jr.
1955 Evidence of early man in Torrance County, New Mexico. Texas Archeological Society, Bulletin 26, pp. 144-164.
1964 Fluted projectile points: their age and dispersion. Science, vol. 145, no. 3639, pp. 1408-1413.
1970 Geochronology of man-mammoth sites and their bearing on the origin of the Llano complex. In: Pleistocene and Recent environments of the central Great Plains. Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publication 3, pp. 77-92.
1975 Pleistocene and Recent stratigraphy. In: Late Pleistocene environments of the southern high plains, edited by Fred Wendorf and James J. Hester. Fort Burgwin Research Center Publication 9, pp. 57-96.
- Haynes, C. Vance, Jr., and George Agogino
1960 Geologic significance of a new radiocarbon date from the Lindenmeier site. Denver Museum of Natural History, Proceedings No. 9.
- Haynes, Guy H.
1932 A report on the excavations at Saddleback ruin. M.A. thesis. Texas Tech University, Lubbock.
- Hazlitt, Ruth, editor
1934 The journal of Francois Antoine Larocque from the Assiniboine River to the Yellowstone - 1805. Historical Reprints, Sources of Northwest History No. 20. State University of Montana, Missoula.
- Herold, Laurance C.
1968 An archaeological-geographical survey of the Rio Grande de Ranchos. Papers on Taos Archaeology. Fort Burgwin Research Center, No. 7, pp. 9-42.
- Hertner, Henry E., editor
1963 Alibates flint quarries, a national monument. Potter County Historical Survey and Panhandle Geological Society, 1. Amarillo, TX.
- Hertner, Henry E.
1964 Alibates flint quarries, a national monument. Potter County Historical Survey Committee and Panhandle Geological Society. Supplement 2.
- Hesse, Curtis J.
1943 Some archeological material in the Museum of the A & M College of Texas. Bulletin of the Texas Archaeological and Paleontological Society, vol. 15, pp. 80-91.
- Hester, J.J.
1962 A Folsom lithic complex from the Elida site, Roosevelt County, New Mexico. El Palacio, vol. 69, no. 2, pp. 92-113.
1966 Origins of the Clovis culture. XXXVI Congreso Internacional de Americanistas, Espana, 1964, Actas y Memorias, vol. 1, pp. 129-142.
- Hester, J.J., E.L. Lundelius, Jr., and R. Frycell
1972 Blackwater locality no. 1, a stratified early man site in eastern New Mexico. Fort Burgwin Research Center Publication no. 8.
- Hester, Thomas R.
1976 Late Pleistocene aboriginal adaptations in Texas. In: Papers on Paleo-Indian archaeology in Texas. Center for Archaeological Research, University of Texas at San Antonio, Special Report, vol. 3, pp. 1-14.
1977 Excavations at St. Mary's Hall (41 BX 229): a buried Plainview campsite in southcentral Texas. Paper presented at the annual meeting of the Texas Archeological Society, Arlington.
1978 Early human occupations in southcentral and southwestern Texas: preliminary papers on the Baker Cave and St. Mary's Hall sites. Center for Archaeological Research. University of Texas at San Antonio.
- Hibben, F.C.
1941 Evidence of early occupation in Sandia Cave, New Mexico and other sites in the Sandia-Manpano region. Smithsonian Miscellaneous Collections, vol. 99, no. 23.

- Hill, A.T., and Paul Cooper
1937 The archeological campaign of 1937. *Nebraska History Magazine*, vol. 18, no. 4, pp. 243-359.
- Hill, A.T., and Marvin Kivett
1941 Woodland-like manifestations in Nebraska. *Nebraska History*, vol. 21, no. 3, pp. 146-243.
- Hill, A.T., and George Metcalf
1942 A site of the Dismal River Aspect in Chase County, Nebraska. *Nebraska History*, vol. 22, no. 2, pp. 158-226.
- Hill, A.T., and Waldo R. Wedel
1936 Excavations at the Leary Indian village and burial site, Richardson County, Nebraska. *Nebraska History Magazine*, vol. 17, no. 1, pp. 2-73.
- Hodge, F.W., editor
1907- Handbook of American Indians north of Mexico. Bureau of American Ethnology Bulletin
1910 30, 2 parts. Washington.
- Hodge, F.W., G.P. Hammond, and A. Rey
1945 Fray Alonso de Benevides' revised memorial of 1634. University of New Mexico Press, Albuquerque.
- Hofman, Jack L.
1971 A surface survey of the Ross site, Cd-69, Caddo County, Oklahoma. *Oklahoma Anthropological Society Bulletin* vol. 20, pp. 101-114.
1973 Cd-177: a small archaic camp in westcentral Oklahoma. *Oklahoma Anthropological Society Bulletin*, vol. 22, pp. 171-206.
1975 A study of Custer-Washita River foci relationships. *Plains Anthropologist*, vol. 20, no. 67, pp. 41-52.
1978a An alternative view of some southern plains archaic stage characteristics. *Plains Anthropologist*, vol. 23, no. 82, pp. 311-317.
1978b The development and northern relationships of two archaeological phases in the southern plains subarea. In (Donald J. Blakeslee ed.) *The central plains tradition: internal development and external relationships*. Office of the State Archeologist, Iowa, Report No. 11, pp. 6-35.
1979 The western Protohistoric: a summary of the Edwards and Wheeler complexes. Unpublished Manuscript cited by Baugh 1982.
- Hojjer, Harry
1938 The southern Athapaskan languages. *American Anthropologist*, vol. 40, pp. 74-76.
1956 The chronology of the Athapaskan languages. *International Journal of American Linguistics*, vol. 22, no. 4, pp. 219-232.
1971 The position of the Apachean languages in the Athapaskan stock. Pp. 3-6 in *Apachean culture history and ethnology*. Keith H. Basso and Morris E. Opler, eds. *Anthropological Papers of the University of Arizona* 21. Tucson.
- Holden, W.C.
1929 Some recent explorations and excavations in northwest Texas. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 1, no. 7, pp. 23-35.
1931 The Texas Tech archaeological expedition, summer 1930. *Texas Archaeological and Paleontological Society-Bulletin*, vol. 3, pp. 43-53. (Tierra Blanca).
1933 Excavation of Saddleback ruin. *Bulletin of the Texas Archeological and Paleontological Society*, vol. 5, pp. 39-52.
- Holder, Preston, and Joyce Wike
1949 The Frontier culture complex, a preliminary report on a prehistoric hunters' camp in southwestern Nebraska. *American Antiquity*, vol. 14, no. 4, pp. 260-266.
- Holliday, Vance T.
1977 Cultural chronology of the Lubbock Lake site. Unpublished Master's Thesis, Texas Tech University, Lubbock.
- Hollingsworth, Alma
1976 Bison hump shelter. *Southwestern Lore*, vol. 42, nos. 1-2, pp. 27-32.
- Honea, K.H.
1964 A late archaic horizon site near Folsom, New Mexico. An archaeological salvage project conducted by the Museum of New Mexico and the State Highway Department. Museum of New Mexico. MS.

- Hopkins, David M. et al
1982 Paleocology of Beringia. Academic Press, New York.
- Hotz, Gottfried
1960 Indianische Ledermalerei. Verlag von Dietrich Reimer, Berlin.
1970 Indian skin paintings from the American southwest. University of Oklahoma Press, Norman.
(Translation of Hotz 1960.)
- Howard, E.B.
1935a Evidence of early man in North America. University Museum, University of Pennsylvania, Journal 24.
1935b Early human remains in the southwest. Report of XVI International Geological Congress, Washington, 1933.
- Howard, E.B., Linton Satterthwaite, Jr., and Charles Bache
1941 Preliminary report on a buried Yuma site in Wyoming. American Antiquity, vol. 7, pp. 70-74.
1943 The Finley site: discovery of Yuma points, in situ, near Eden, Wyoming. American Antiquity, vol. 8, pp. 224-234.
- Hughes, David T.
1977a Analysis of certain prehistoric bison kills in the Texas panhandle and adjacent areas. MA thesis, University of Arkansas, Fayetteville.
- Hughes, Jack T.
1949 Investigations in western South Dakota and northeastern Wyoming. American Antiquity, vol. 14, no. 4, pp. 266-277.
1955a Little Sunday: an archaic site in the Texas panhandle. Bulletin of the Texas Archaeological Society, vol. 26, pp. 55-74.
- Hughes, Jack T.
1955b Guest editor, Panhandle-Plains Historical Review, prehistory issue, vol. 28, Canyon, TX.
1959 Archeological survey of Greenbelt Reservoir, Donley County, Texas. Report submitted to the National Park Service by the Panhandle-Plains Historical Museum, Canyon, TX.
1962 Lake Creek: a Woodland site in the Texas panhandle. Bulletin of the Texas Archeological Society, vol. 32, pp. 65-84. Austin, Texas.
1968 Prehistory of Caddoan-speaking peoples. PhD dissertation, Columbia University.
1973a Archeology, pp. 2-26 to 2-86, in Environmental inventory and assessment of areas VI, IX, XIII, XIV, and XV, Red River chloride control project, Oklahoma and Texas, report submitted to the U.S. Army Corps of Engineers by West Texas State University, Canyon.
1973b Data for archeology section of environmental impact statement on Blue West and Bates Canyon area, Lake Meredith Recreation Area, Texas, report submitted to Ecology Audits, Inc., Dallas, TX.
1974a An archeological survey of a proposed pipeline route in Alibates National Monument, report submitted to the National Park Service and Colorado Interstate Gas Company, Amarillo, TX.
1974b Prehistory of the Caddoan-speaking tribes. Garland Publishing Inc., New York, NY.
1976 The panhandle archaic. In The Texas archaic: a symposium, edited by Thomas R. Hester, Center for Archaeological Research, the University of Texas at San Antonio, Special Report No. 2, pp. 28-38.
1977 A chronological bibliography of panhandle archeology. Archeological Research Laboratories, West Texas State University, Canyon.
- Hughes, Jack T. and H. Charles Hood
1975 An archeological survey in the Lakeview watershed. West Texas State University. Report submitted to the Soil Conservation Service.
- Hughes, Jack T. and Kim E. Taylor
1975 Archeological salvage at pipeline construction in Alibates National Monument, report submitted to the National Park Service and Colorado Interstate Gas Company, Amarillo, TX.
- Hughes, Jack T., Harlan C. Hood, and Billy Pat Newman
1974 Preliminary report on an archeological survey of the Red Deer Creek watershed, report submitted to the National Park Service by the ARL. West Texas State University, Canyon.
- Hughes, Jack T., and Patrick S. Willey
1978 Archeology at Mackenzie Reservoir. Texas Historical Commission, Archeological Survey Report No. 24. Austin.

- Humphrey, Robert L. and Dennis Stanford, editors
 1979 Pre-Llano cultures of the Americas: paradoxes and possibilities. The Anthropological Society of Washington.
- Hunt, C.B.
 1954 Pleistocene and Recent deposits in the Denver area, Colorado. United States Geological Survey, Bulletin 996-C, pp. 91-140.
- Hunt, Grant O.
 1975 The archaeology of the Belwood site. M.A. Thesis, Department of Anthropology, University of Denver, Denver.
- Hurst, C.T.
 1941 A Folsom location in the San Luis valley, Colorado. *Southwestern Lore*, vol. 7, no. 2.
 1943 A Folsom site in a mountain valley of Colorado. *American Antiquity*, vol. 7, pp. 70-74.
- Huscher, Betty and Harold Huscher
 1943 The hogan builders of Colorado. *Southwestern Lore*, vol. 9, no. 2.
- Huscher, H.
 1941 Grant no. 557. Continuation of archaeological survey of southern and western Colorado. Yearbook, American Philosophical Society, pp. 226-227.
- Husted, Wilfred M.
 1963 A rock alignment in the Colorado front range. *Plains Anthropologist*, vol. 8, no. 22, pp. 221-224.
- Hyde, George E.
 1934a The Pawnee Indians, part one, 1500-1680. The Old West Series, no. 4. Denver.
 1934b The Pawnee Indians, part two, 1680-1770. The Old West Series, no. 5. Denver.
 1951 Pawnee Indians. The University of Denver Press, Denver.
- Indian Claims Commission
 1957 Findings, Cheyenne-Arapahoe tribes of Indians, etc., et al vs. the United States of America. (1955-1961). *American Indian Ethnohistory*, Plains Indians, Arapaho-Cheyenne Indians, pp. 229-342. New York and London.
- Irving, J.T.
 1835 Indian sketches. 2 vols. Philadelphia.
 1955 Indian sketches taken during an expedition to the Pawnee tribes. University of Oklahoma Press, Norman.
- Irving, W.N.
 1971 Recent early man research in North America. *Arctic Anthropology*, vol. 8, no. 2, pp. 68-82.
- Irving, W.N.
 1978 Pleistocene archaeology in eastern Beringia, In *Early man in America: from a circum-Pacific perspective*. A.L. Bryan, ed. Pp. 96-101. Occasional Papers No. 1, Department of Anthropology, University of Alberta. Edmonton: Archaeological Researches International.
- Irwin, Cynthia and Henry Irwin
 1957 The archeology of the Agate Bluff area, Colorado. *Plains Anthropologist*, no. 8, pp. 15-38.
- Irwin-Williams, Cynthia
 1967 Picoa: the elementary southwestern culture. *American Antiquity*, vol. 34, no. 4, pp. 441-456.
- Irwin-Williams, Cynthia and Henry Irwin
 1966 Excavations at Magic Mountain: a diachronic study of plains southwest relations. Denver Museum of Natural History, Proceedings 12. Denver. (General overview, especially relevant for the Archaic.)
- Irwin-Williams, Cynthia, Henry Irwin, George Agogino, and C. Vance Haynes
 1973 Hell Gap: Paleo-Indian occupation on the high plains. *Plains Anthropologist*, vol. 18, no. 59, pp. 40-53.
- Irwin, H.J. and Cynthia Irwin
 1959 Excavations at the LoDaisKa site. Denver Museum of Natural History Proceedings, no. 8.
 1961 Radiocarbon dates from the LoDaisKa site, Colorado. *American Antiquity*, vol. 27, no. 1, pp. 114-115.
- Irwin, H., and H.M. Wormington
 1970 Paleo-Indian tool types in the Great Plains. *American Antiquity*, vol. 35, no. 1, pp. 24-34.

- Jablow, Joseph
1950 The Cheyenne in plains Indian trade relations 1795-1840. Monographs of the American Ethnological Society, no. XIX. New York.
- Jackson, A.T.
1938 Picture-writing of Texas Indians. The University of Texas Publication no. 3809, Austin.
- Jackson, Donald, editor
1966 The journals of Zebulon Montgomery Pike. With letters and related documents. Two volumes. University of Oklahoma Press, Norman.
- James, Edwin, comp.
1822- Account of an expedition from Pittsburgh to the Rocky Mountains, performed in the years
1823 1819 and 1820, by order of the Hon. J.C. Calhoun, Sec'y. of War: under the command of Major Stephen H. Long. . . 2 volumes and atlas, Philadelphia.
- James, Thomas
1916 Three years among the Indians and Mexicans. Edited by Walter B. Douglas. Missouri Historical Society, St. Louis.
- Jefferson, Thomas
1806 Message from the President of the United States communicating discoveries made in exploring the Missouri, Red River and Washita, by Captains Lewis and Clark, Doctor Sibley, and Mr. Dunbar; with a statistical account of the countries adjacent. Washington, D.C.
- Jelinek, A.J.
1967 A prehistoric sequence in the middle Pecos valley, New Mexico. University of Michigan, Museum of Anthropology, Anthropological Papers no. 31, Ann Arbor.
- Jennings, Jesse D., A.R. Schroedl, and R.N. Holmer
n.d. Sudden shelter. University of Utah Anthropological Papers 101.
- Jennings, J.D.
1957 Danger Cave. Memoirs of the Society for American Antiquity, no. 14. Salt Lake City.
- Jepsen, Glenn L.
1953a Ancient buffalo hunters of northwestern Wyoming. Southwestern Lore, vol. 19, pp. 19-25.
1953b Ancient buffalo hunters. Princeton Alumni Weekly, vol. 53, no. 25, pp. 10-12.
- Jett, Stephen C.
1964 Pueblo Indian migrations: an evaluation of the physical and cultural determinants. American Antiquity, vol. 29, no. 3, pp. 281-300.
- John, Elizabeth A.H.
1975 Storms brewed in other men's worlds; the confrontation of Indians, Spanish, and French in the Southwest, 1540-1795. Texas A&M University Press, College Station.
- Johnson, Alfred E.
1973 Archaeological investigations at the Budenbender site, Tuttle Creek Reservoir, north-central Kansas, 1957. Plains Anthropologist, vol. 18, no. 62, pp. 271-299.
- Johnson, C. Stewart
1934 Report to the anthropology department of the University of Oklahoma concerning the fieldwork carried on in the Slab-House site on the Stamper Ranch, south of Optima, Oklahoma in the summer of 1934. Manuscript on file at Stovall Museum, Norman, and Panhandle Plains Historical Museum.
1939 A report on the Antelope Creek ruin. Bulletin of the Texas Archaeological and Paleontological Society, vol. 11, pp. 190-202.
- Johnson, Eileen
1976 Investigations into the zooarchaeology of the Lubbock Lake site. Unpublished Ph.D. dissertation, Texas Tech University, Lubbock.
1978 Paleo-Indian bison procurement and butchering patterns on the Llano Estacado. Plains Anthropologist, vol. 23, no. 82, pt. 2, pp. 98-105.
- Johnson, Eileen and Vance T. Holliday
1980 A Plainview kill/butchering locale on the Llano Estacado - the Lubbock Lake site. Plains Anthropologist, vol. 25, no. 88, pp. 89-111.
- Johnson, Frederick, assembler
1951 Table of radiocarbon dates. In: Radiocarbon dating. American Antiquity, vol. XVII, no. 1, pt. 2, Memoirs, pp. 5-19.
- Jokerst, Carol O.
1972 A floodplain burial in Randall County, Texas. Lower Plains Archeological Society Bulletin no. 2 (for 1971), pp. 1-4, Midland, TX.

- Judge, W.J.
1970 Systems analysis and the Folsom-Midland question. *Southwestern Journal of Anthropology*, vol. 26, no. 1.
- Kainer, Ronald E.
1974 A brief descriptive summary of the Spring Gulch site, Larimer County, Colorado. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 37-41.
1976 Archaeological investigations at the Spring Gulch site (5LR252). MA thesis, Department of Anthropology, Colorado State University, Fort Collins.
- Kane, Allen E.
1976 Chemical analysis of a stratigraphic column from Draper Cave, Custer County, Colorado. *Southwestern Lore*, vol. 42, no. 3, pp. 14-23.
- Katz, Susanna R. and Paul R.
1976 Archeological investigations in lower Tule Canyon, Briscoe County, Texas. Office of the State Archeologist, Archeological Survey Report 16, Austin.
- Kehoe, Thomas F., and Bruce A. McCorquodale
1961 The Avonlea point, horizon marker for the northwestern plains. *Plains Anthropologist*, vol. 6, no. 13, pp. 179-188.
- Keith, Kenneth D. and Clyde C. Snow
1976 The Gore pit skeleton: earliest dated human burial from Oklahoma. *Plains Anthropologist*, vol. 21, no. 74, pp. 283-290.
- Keleher, William A.
1964 Maxwell land grant. New York: Argosy-Antiquarian Ltd.
- Kelley, Jane Holden
1964 Comments on the archeology of the Llano Estacado. *Bulletin of the Texas Archeological Society*, vol. 35, pp. 1-18.
1974 A brief resume of artifacts collected at the Lubbock Lake site prior to 1961. In: Craig C. Black (ed.), *History and prehistory of the Lubbock Lake site*, The Museum Journal, vol. 15, pp. 43-78.
- Kendrick, Judson
1966 The Alibates National Monument. In: West Texas State University Geological Society Guidebook for 1966 Southwestern Association of Student Geological Societies Annual Field Trip, pp. 53-57, Canyon.
- Kenner, Charles L.
1969 A history of New Mexican-Plains Indian relations. University of Oklahoma Press, Norman.
- Kiehl, Mary
1953 The Glen Elder and White Rock sites in north-central Kansas. Abstract. In: *Proceedings of the Nebraska Academy of Sciences*, May 1.
- King, James T.
1963 War Eagle, a life of General Eugene A. Carr. University of Nebraska Press, Lincoln.
- Kirkland, Forrest
1942 Indian pictographs and petroglyphs in the panhandle region of Texas. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 14, pp. 9-26.
- Kirkland, Forrest, and W.W. Newcomb, Jr.
1967 The rock art of the Texas Indians. The University of Texas Press, Austin.
- Kirkpatrick, David T. and Richard I. Ford
1977 Basketmaker food plants from the Cimarron district, northeastern New Mexico. *The Kiva*, vol. 42, nos. 3-4, pp. 257-269.
- Kivett, Marvin F.
1947 Preliminary appraisal of the archeological and paleontological resources of Wray Reservoir, Yuma County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1948 Archeological investigations in Medicine Creek Reservoir, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1949a Archaeological investigations in Medicine Creek Reservoir, Nebraska. *American Antiquity*, vol. 14, no. 4, pp. 278-284.
- Kivett, Marvin F.
1949b A Woodland pottery type from Nebraska. *Proceedings of the Fifth Plains Conference for Archeology*. University of Nebraska, Laboratory of Anthropology, Notebook no. 1, pp. 67-69.

- 1952 Woodland sites in Nebraska. Nebraska State Historical Society, Publications in Anthropology, no. 1. Lincoln.
 - 1953 The Woodruff ossuary, a prehistoric burial site in Phillips County, Kansas. Bureau of American Ethnology Bulletin 154, River Basin Survey Paper no. 3, pp. 109-142.
 - 1961a An archaic horizon? Plains Archeological Conference News Letter, vol. III, Reprint, pp. 46-49.
 - 1961b Preliminary appraisal of the archeological resources of the Red Willow Reservoir, Hayes, Frontier, and Red Willow counties, Nebraska. MS on file, Midwestern Archeological Center, National Park Service, Lincoln.
 - 1962 Archaeological field report 1961. In: Salvage Archaeology in the Plains, Robert L. Stephenson, Chairman, Plains Anthropologist, vol. 7, no. 16, p. 77.
 - 1970 Early ceramic environmental adaptations. In: Pleistocene and Recent environments of the central Great Plains. Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publication 3, pp. 93-102.
- Kivett, Marvin F., and Waldo R. Wedel
- 1948 Memorandum report on archeological investigations at Medicine Creek Reservoir, Nebraska, by the River Basin Surveys, Smithsonian Institution, March 29-August 20, 1948. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Knudson, Ruthann
- 1973 Organizational variability in late Paleo-Indian assemblages. Ph.D. dissertation, Washington State University, Pullman.
- Krause, Richard A.
- 1969 Correlation of phases in central plains prehistory. In: Two house sites in the central plains: an experiment in archaeology, edited by W.R. Wood, Plains Anthropologist, Memoir 6, pp. 82-96.
 - 1970 Aspects of adaptation among upper Republican subsistence cultivators. In: Pleistocene and Recent environments of the central Great Plains. Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publication 3, pp. 103-116.
- Krieger, Alex
- 1946 Culture complexes and chronology in northern Texas. University of Texas Publication no. 4640. Austin.
 - 1947 Certain projectile points of the early American hunters. Bulletin of the Texas Archaeological and Paleontological Society, vol. 18, pp. 7-27.
- Kuhman, Gary L.
- 1968 A preliminary report on the clinging cactus site, Colfax County, New Mexico. (MS in Anthropology Laboratories, Northern Illinois University, DeKalb.)
- Lang, Richard W.
- 1977 The prehistoric pueblo cultural sequence in the northern Rio Grande. School of American Research. Paper presented at the 1977 Pecos Conference. Santa Fe.
 - 1982 Transformation in white ware pottery of the northern Rio Grande. In: Southwestern ceramics: a comparative view. The Arizona Archaeologist, no. 15, pp. 153-200.
- Lavender, David
- 1954 Bent's Fort. University of Nebraska Press, Lincoln.
- Lawton, Sherman P.
- 1968 The Duncan-Wilson bluff shelter: a stratified site of the southern plains. Oklahoma Anthropological Society Bulletin no. 16, pp. 1-94.
- Leach, Larry L.
- 1966 Excavations at Willowbrook: a stratified site near Morrison. South-western Lore, vol. 32, no. 2, pp. 25-46.
- Lehmer, Donald J.
- 1971 Introduction to middle Missouri archeology. National Park Service, Anthropological Papers no. 1.
- Leonhardy, Frank C.
- 1966 Test excavations in the Mangum Reservoir area of southwestern Oklahoma. Contributions of the Museum of the Great Plains. no. 2, Lawton.
- Leonhardy, Frank C. (ed.)
- 1966 Domebo: a Paleo-Indian mammoth kill on the prairie-plains. Contributions of the Museum of the Great Plains, no. 1, Lawton, OK.

- Lewis, Meriwether
1814 History of the expedition under the command of Captains Lewis and Clark, to the sources of the Missouri, thence across the Rocky Mountains and down the river Columbia to the Pacific Ocean. Performed during the years 1804-1805-1806. Prepared for the press by Paul Allen, esquire. 2 vols. Philadelphia and New York.
- Lewis, M., and Wm. Clark
1904 Original journals of the Lewis and Clark expedition, 1804-1806. Edited by R.G. Thwaites. New York.
- Lewis, Sol
1973 The Sand Creek Massacre, a documentary history. "First published as a report of the joint committee on the conduct of the war, massacre of the Cheyenne Indians, 38th Congress, Second Session, Washington, 1965 (sic); and report of the Secretary of War, 39th Congress, Second Session, Senate Executive Document no. 26, Washington, 1867. The edition includes the reply of Governor Evans of the Territory of Colorado, 1865." New York.
- Libby, Willard R.
1955 Radiocarbon dating. 2nd edition, University of Chicago Press.
- Lintz, Christopher R.
1976a The McGrath site of the panhandle aspect. Bulletin of the Oklahoma Anthropological Society, vol. 25, pp. 1-110.
1976b Test excavations at the Kenton bison kill site (Ci-81), Cimarron County, Oklahoma. Oklahoma Anthropological Society Newsletter, vol. 24, no. 7, pp. 2-7.
1978a Architecture and radiocarbon dating of the Antelope Creek focus: a test of Campbell's model. Plains Anthropologist, vol. 23, no. 82, pp. 319-328.
1978b The Johnson-Cline site (Tx-40), an upland dune site in the Oklahoma panhandle. Bulletin of the Oklahoma Anthropological Society, vol. 27, pp. 111-140.
1978c Review of R. G. Campbell's The Panhandle Aspect of the Chaquaqua Plateau. Plains Anthropologist, vol. 23, no. 82, pp. 341-344.
1978d Selected bibliography of the Antelope Creek focus of Texas and Oklahoma (with revisions). MS, 19 pp. and 2 p. addendum added in June, 1980.
- Lintz, Christopher R.
1978e The panhandle aspect and its early relationship with upper Republican. In (Blakeslee ed.) The Central Plains Tradition: Internal Development and External Relationships. Office of the State Archaeologist, report 11, University of Iowa, pp. 36-55.
1979a The southwestern periphery of the plains Caddoan area. Nebraska History, vol. 60, no. 2, pp. 161-182.
1979b Radiocarbon and archaeomagnetic dates from the Two Sisters site, 34Tx-32, Texas County, Oklahoma. Oklahoma Anthropological Society Newsletter, vol. 27, no. 6, pp. 1-9.
1980a Selected bibliography of the Antelope Creek focus of Texas and Oklahoma. First prepared 1978, and 2 p. addendum added in June, 1980. MS, 19 pp.
1980b An archaeological bibliography of the Oklahoma panhandle. MS.
- Lippincott, K.A.
1978 Solomon River upper Republican ecology. In The Central Plains Tradition: Internal Development and External Relationships, edited by D.J. Blakeslee, pp. 81-93. The University of Iowa, Office of the State Archaeologist, report no. 11. Iowa City.
- Lister, R.H.
1948 Notes on the archaeology of Watrous Valley, New Mexico. El Palacio, vol. 55, pp. 35-41, Santa Fe.
1953 The stemmed indented base point, a possible horizon marker. American Antiquity, vol. 18, no. 3, pp. 264-265. Salt Lake City.
- Lobdell, J.E.
1973 The Scoggin site: an early middle period bison kill. Wyoming Archeologist, vol. 16, nos. 3-4, pp. 1-17.
- Lombardy, Frank
1966 Domebo: a Paleo-Indian mammoth kill on the prairie-plains. Contributions of the Museum of the Great Plains, no. 1. Lawton.
- Long, Austin
1965 Smithsonian Institution radiocarbon measurements II. Radiocarbon, vol. 7, pp. 245-256.
- Loomis, Noel M. and Abraham P. Nasatir
1967 Pedro Vial and the roads to Santa Fe. University of Oklahoma Press, Norman.

- Lowery, E. J.
1932 The archaeology of the Antelope Creek ruin. M.A. thesis, Texas Technical College, Lubbock, Texas.
- Lowery, Woodbury
1912 The Lowery collection, a descriptive list of maps of the Spanish possessions within the present limits of the United States, 1502- 1820. Washington.
- Ludwickson, John
1975 The Loup River phase and the origins of Pawnee culture. M.A. thesis, University of Nebraska, Lincoln.
1978 Central plains tradition settlements in the Loup River basin: the Loup River phase. Pp. 94-105 in *The Central Plains Tradition: Internal Development and External Relationships*, edited by Donald J. Blakeslee. Report no. 11, Office of the State Archaeologist, Iowa City.
- Luebbers, Roger
1971 Tool analysis. In: *Archaeological investigations at the Wilbur Thomas shelter, Carr, Colorado*, assembled and edited by David A. Breternitz. *Southwestern Lore*, vol. 36, no. 4, pp. 66-79.
- Luttig, John C.
1964 *Journal of a fur-trading expedition on the upper Missouri 1812-1813*. Edited by Stella A. Drumm. Artosy-Antiquarian Ltd., New York.
- Lutz, Bruce and William J. Hunt, Jr.
1979 Models for patterns and change in prehistoric settlement-subsistence systems of the Purgatoire and Apishapa highlands. Report on file, Interagency Archeological Services, U.S. Dept. of the Interior, Denver.
- Lyons, Ray D.
1976 Floral analysis, 5CR1, Draper Cave, Colorado. *Southwestern Lore*, vol. 42, no. 3, pp. 33-37.
- McCall, Geo. A.
1851 Report of the Secretary of War, communicating, in compliance with a resolution of the Senate, Colonel McCall's reports in relation to New Mexico, February 10, 1851. Senate Ex. Doc. - 31st Cong., 2d Sess., no. 26. Washington.
- McClintock, Walter
1968 The old north trail, or live, legends and religion of the Blackfeet Indians. University of Nebraska Press, Lincoln. (Originally published in 1910 in London).
- McDermott, John F.
1965 The French in the Mississippi valley. University of Illinois Press, Urbana.
- McDermott, John F. (editor)
1974 The Spanish in the Mississippi valley 1762-1804. University of Illinois Press, Urbana.
- MacDougall, John
1896 Saddle, sled and snowshoe: pioneering on the Saskatchewan in the sixties. Ryerson Press, Toronto.
- Malde, Harold E.
1960 Geological age of the Claypool site, northeastern Colorado. *American Antiquity*, vol. 26, no. 2, pp. 236-243.
- Malone, James M.
1970 Archaeological reconnaissance in the MacKenzie Reservoir area of Tule Canyon. Texas State Historical Survey Committee and Texas Water Development Board, Archaeological Survey Report no. 8.
- Marcy, Randolph B.
1853 Exploration of the Red River of Louisiana in the year 1852. Senate Exec. Doc. [U.S.] 32nd. Cong., 2d Sess., no. 54. Washington.
1856 . . . The report and maps of Captain Marcy of his explorations of the Bi Wichita and headwaters of the Brazos Rivers. Senate Exec. Doc. [U.S.] 34th Cong., 1st Sess., no. 60.
- Margry, Pierre
1875-1886 *Decouveretes et etablissemments des Francais dans l'ouest de dans le sud de l'Amerique septentrionale (1614-1754) Memoires et Doucements originaux*, 6 vols. Paris.
- Marmaduke, Bill
in prep. Untitled -- a report on an archeological survey of the Alamosa Creek area in Oldham County, Texas.

- Martin, H.T.
1909 Further notes on the Pueblo ruins of Scott County. *Kansas University Science Bulletin*, vol. 5, no. 2, pp. 11-12.
- Mason, J. Alden
1929 The Texas expedition. *University of Pennsylvania Museum Journal*, vol. 20, nos. 3-4, pp. 318-338.
- Mattes, Merrill J.
1965 Archaeology of the Bisterfeldt Potato Cellar site. *Southwestern Lore*, vol. 31, no. 3, pp. 56-61.
- Medina, Douglas M.
1974 Excavations at Ken Caryl Ranch, 1973 and 1974, report on Bradford house III. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 46-48.
- Mera, H.P.
1935 Ceramic clues to the prehistory of north-central New Mexico. *Laboratory of Anthropology Technical Series Bulletins*, no. 8. Santa Fe.
- Metcalf, George
1949 Three pottery types from the Dismal River aspect. *Proceedings of the Fifth Plains Conference for Archeology*, University of Nebraska, Laboratory of Anthropology, Notebook no. 1, pp. 73-78. Lincoln.
1952 A preliminary study of the pottery from seven upper Republican sites in central Nebraska. Address delivered at the 11th Plains Conference (mimeographed). Lincoln.
n.d. Draft of report on 1939 excavations at Davis Creek, Nebraska. MS, 170 pages.
- Mewhinney, H.
1965 Alibates flint quarry. *Texas Parks and Wildlife*, vol. 23, no. 8, pp. 20-25.
- Millbrook, Minnie Dubbs
1973 Custer's first scout in the West. *Kansas Historical Quarterly*, vol. 39, pp. 75-95.
- Miller, E.O. and Edward B. Jelks
1952 Archaeological excavations at the Belton Reservoir, Coryell County, Texas. *Texas Archaeological and Paleontological Society Bulletin* 23, pp. 168-217.
- Miller, Nyle H.
1977 The annual meeting, report of the Executive Director, year ending Oct. 19, 1976. *The Kansas Historical Quarterly*, vol. 43, no. 1, pp. 78-98.
- Mindeleff, Cosmos
1898 Navaho houses. *Bureau of American Ethnology*, annual report, vol. 17, pp. 475-517. Washington.
- Minge, Ward Alan
1979 Efectos del pais: a history of weaving along the Rio Grande. In: *Spanish textile tradition of New Mexico and Colorado*, pp. 8-28. Museum of International Folk Art, Santa Fe.
- Monger, E.
1970 A preliminary report of the Larned site. *Kansas Anthropological Association Newsletter*, vol. 15, no. 8, pp. 1-15.
1974 Site 14PA301, an interpretation. *Kansas Anthropological Association Newsletter*, vol. 20, no. 3, pp. 1-6.
- Moomaw, Jack C.
1954 Ancient stone "walls" in the Colorado Rockies. *Southwestern Lore*, vol. 20, no. 1, pp. 5-6. Boulder.
- Mooney, James
1896 The ghost-dance religion and the Sioux outbreak of 1890. *Bureau of American Ethnology*, annual report, no. 14, part 2. Washington.
1898 Calendar history of the Kiowa Indians. *Bureau of American Ethnology*, annual report, no. 17, part 1, pp. 129-445.
- Moore, Ray
1966 Archeology of Palo Duro Canyon in WTSUGS guidebook for 1966 SASGS annual field trip, pp. 35-37, Canyon.
- Moorehead, Warren K.
1921 Recent explorations in northwestern Texas. *American Anthropologist*, vol. 23, no. 1, pp. 1-11.
1931 The archaeology of the Arkansas River valley. Andover Press, Andover.

- Morlan, R.E.
 1976 The Yukon refugium project, 1975 field season. *Quaternary Research in Canada*, vol. 7, pp. 49-57.
 1978 Early man in northern Yukon territory: perspectives as of 1977. In *Early man in America: from a circum-Pacific perspective*. A.L. Bryan, ed. Pp. 78-95, Occasional Papers, Department of Anthropology, University of Alberta, no. 1. Edmonton: Archaeological Researches International.
- Morse, Jedidiah
 1822 A report to the Secretary of War of the United States, on Indian affairs, comprising a narrative of a tour performed in the summer of 1820. New Haven.
- Morton, Harry C.
 1954 Excavation of a rock shelter in Elbert County, Colorado. *Southwestern Lore*, vol. 20, no. 3, pp. 30-41.
- Moss, John H., in collaboration with Kirk Bryan, G. William Holmes, Linton Satterthwaite, Jr., Henry P. Hansen, C. Bertrand Schultz, and W.D. Frankforter
 1951 Early man in the Eden valley. The University Museum, University of Pennsylvania, Museum Monographs 6.
- Moulton, Gary E.
 1983 Atlas of the Lewis and Clark expedition. The journal of the Lewis and Clark expedition, vol. 1. University of Nebraska Press, Lincoln.
- Mulloy, William T.
 1954 The McKean site in northeastern Wyoming. *Southwestern Journal of Anthropology*, vol. 10, no. 4, pp. 432-460.
 1958 A preliminary historical outline for the northwestern plains. University of Wyoming Publications, vol. 22, pp. 1-235.
 1959 The James Allen site, near Laramie, Wyoming. *American Antiquity*, vol. 25, no. 1, pp. 112-116.
- Murdock, George Peter and Timothy J. O'Leary
 1975 *Ethnographic bibliography of North America*, volume 5 - plains and southwest. (4th Edition). HRAF Press, New Haven.
- Murray, Charles Augustus
 1839 *Travels in North America during the years 1834, 1835 and 1836: including a summers residence with the Pawnee tribe of Indians...* 2 vols., London.
- Myers, Thomas P., Lloyd G. Tanner, and R. George Corner
 1980 A new Paleoindian site in western Nebraska. *UNL News - Museum Notes*, University of Nebraska State Museum and Planetarium, Lincoln, vol. 60, no. 19. Museum Notes, no. 69.
- Nasatir, A.P.
 1952 *Before Lewis and Clark, documents illustrating the history of the Missouri 1785-1804*. 2 vols. St. Louis Historical Documents Foundation.
 1974 More on Pedro Vial in upper Louisiana. In: *The Spanish in the Mississippi valley 1762-1804*. F.J. McDermott, editor, pp. 100-119. University of Illinois Press, Urbana.
- Nelson, Charles E.
 1967b The archaeology of Hall-Woodland Cave. *Southwestern Lore*, vol. 33, pp. 1-13.
 1969 Salvage archaeology on Van Bibber Creek, site 5JF10. *Southwestern Lore*, vol. 34, no. 4, pp. 85-106.
 1971 The George W. Lindsay ranch site, 5JF11. *Southwestern Lore*, vol. 37, no. 1, pp. 1-14.
- Nelson, Charles E., and Jessie E. Graeber
 1966 Excavation of Graeber Cave, North Turkey Creek. *Southwestern Lore*, vol. 32, no. 2, pp. 47-55.
- Neuman, Robert W.
 1962 An archaeological bibliography: the central and northern Great Plains prior to 1930. *Plains Anthropologist*, vol. 7, no. 15, pp. 43-57.
 1967 Atlatl weights from certain sites on the northern and central Great Plains. *American Antiquity*, vol. 32, no. 1, pp. 36-53.
 1968 Additional annotated references: an archeological bibliography of the central and northern Great Plains prior to 1930. *Plains Anthropologist*, vol. 13, no. 40, pp. 100-102.
- Newcomb, W.W.
 1961 *The Indians of Texas from prehistoric to modern times*, University of Texas Press, Austin.

- Nickens, Paul R.
1977 An isolated human burial of probable Woodland association from Golden Gate canyon, Colorado. *Plains Anthropologist*, vol. 22, no. 76, pt. 1, pp. 117-122.
- O'Brien, Patricia J.
1980 Kansas archeology. Kansas State University.
- Oehler, Gottlieb and David Smith
1851 Description of a journey and visit to the Pawnee Indians, April 22- May 18, 1851. *The Moravian Church Miscellany*, 1851-52.
1914 Description of a journey and visit to the Pawnee Indians. New York.
- Ohr, N. Ted, Kenneth L. Kvamme, and Elizabeth Ann Morris
1979 The Lykins valley site (5LR263): a stratified locality on Boxelder Creek, Larimer County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Olson, Byron L.
1978 Excavations at site 5BL70. In *The Mount Albion complex: a study of prehistoric man and the altithermal*, James B. Benedict and Byron L. Olson. Center for Mountain Archeology, Research Report no. 1, pp. 76-117.
- Opler, Morris E.
1938 Myths and tales of the Jicarilla Apache Indians. *American Folklore Society Memoir* 31.
- Otto, W.T. et al
1867 Letter of the Secretary of the Interior communicating...information touching the origin and progress of Indian hostilities on the frontier. Senate Exec. Doc. [U.S.] no. 13, 40th Congress, 1st Sess. [Contains numerous letters and documents requested by the Committee on Indian Affairs.]
- Parks, Douglas R.
1979 The northern Caddoan languages: their subgrouping and time depth. *Nebraska History*, vol. 60, no. 2, pp. 197-213. Peabody Museum
1963 Catalog of the library of the Peabody Museum of Archaeology and Ethnology, Harvard University (53 volumes). Plus 1970 and 1971 supplements (17 volumes). G.K. Hall and Co., Boston.
- Pearson, Emerson L.
1974 Soil characteristics of an archeological deposit: Randall County, Texas. *Bulletin of the Texas Archeological Society*, vol. 45, pp. 151-189.
in Untitled - a report on sites on North cita Canyon in Randall County, Texas.
prep.
- Perino, Gregory
1971 Guide to the identification of certain American Indian projectile points. *Oklahoma Anthropological Society, Special Bulletin* 4.
- Perrin du Lac, Francois Marie
1805- Voyage dans les deux Louisiianes, et chez les nations sauvages du Missouri...en 1801, 1802 et
1807 1803...a Lyon. Travels through the two Louisianas, and among the savage nations of the Missouri...in 1801, 1802 & 1803...Tr. from the French. London.
- Philips, Robert E.
1963 Four Woodland sites in south-central Nebraska. *Plains Anthropologist*, vol. 8, no. 21, pp. 176-179.
- Pope, John
1855 Report of exploration of a route for the Pacific railroad, near the thirty-second parallel of latitude, from the Red River to the Rio Grande. House Ex. Doc. 129, 33rd Cong., 1st Sess.
- Preston, Nolan E.
1969 The McCann site. *Bulletin of the Texas Archeological Society*, vol. 40, pp. 167-192.
- Pustmueller, Helen M.
1977 Notched projectile points from Franktown cave: classification and traditional and statistical analyses. MA thesis. 123 pp. University of Denver.
- Raczka, Paul M.
1972 Traditions of northern plains raiders in New Mexico. *El Corral de Santa Fe westerners*, Brand Book 1973. Pp. 49-53. Santa Fe.
- Ralph, E.K., H.N. Michael, and M.C. Han
1973 Radiocarbon dates and reality. *MASCA Newsletter*, vol. 9, no. 1.

- Rathjen, Fredrick W.
1973 The Texas panhandle frontier. University of Texas Press, Austin and London.
- Reeves, B.
1973 The concept of an altithermal cultural hiatus in northern plains prehistory. *American Anthropologist*, vol. 75, no. 5, pp. 1221-1253.
- Reher, Charles A.
1971 A survey of ceramic sites in southeastern Wyoming. Unpublished MA thesis, Department of Anthropology, University of Wyoming, Laramie.
- Reid, Russell
1965 Verendrye's journey to North Dakota in 1738. *North Dakota History*, vol. 32, no. 2, The State Historical Society, Bismarck, North Dakota.
- Renaud, E.B.
1930 Prehistoric cultures of the Cimarron valley, northeastern New Mexico and western Oklahoma. *Colorado Scientific Society Proceedings*, vol. 12, no. 5, pp. 113-150. Denver.
- Renaud, E.B.
1942 Reconnaissance work in the upper Rio Grande valley, Colorado and New Mexico. University of Denver, Department of Anthropology, Archeological Series, 3rd Pap., Denver.
1947 Archaeology of the high western plains, 17 years of archaeological research. Denver.
- Reynolds, J.D.
1976 The Grasshopper Falls phase: a newly defined plains Woodland cultural-historical integration in the central plains. Paper read at the 34th Annual Plains Conference, Minneapolis, Minnesota.
1979 The Grasshopper Falls phase of the plains Woodland. *Kansas State Historical Society Anthropological Series* no. 7. Topeka.
- Richards, Michael K.
1971 The Lee site - a late prehistoric manifestation in Garvin County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society*, vol. 20, pp. 1-82.
- Richardson, Charles
1974 Summary of excavations at the Ken Caryl ranch, 1973. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 48-49.
- Roberts, Frank H.H., Jr.
1930 Early pueblo ruins in the Piedra district, southwestern Colorado. *Smithsonian Institution, Bureau of American Ethnology Bulletin* 96.
1935a A Folsom camp site and workshop. *Explorations and field-work of the Smithsonian Institution in 1934*, pp. 61-64.
1935b A Folsom complex: preliminary report on investigations at the Lindenmeier site in northern Colorado. *Smithsonian Miscellaneous Collections*, vol. 94, no. 4, pp. 1-35.
- Roberts, Frank H.H., Jr.
1936a Additional information on the Folsom complex: report on the second season's investigations at the Lindenmeier site in northern Colorado. *Smithsonian Miscellaneous Collections*, vol. 95, no. 10, pp. 1-38.
1936b Further investigations at a Folsom campsite in northern Colorado. *Explorations and field-work of the Smithsonian Institution in 1935*, pp. 69-74.
1937 New developments in the problem of the Folsom complex. *Explorations and field-work of the Smithsonian Institution in 1936*, pp. 69-74.
1938 The Lindenmeier site in northern Colorado contributes additional data on the Folsom complex. *Explorations and field-work of the Smithsonian Institution in 1937*, pp. 115-118.
1939a On the trail of ancient hunters in the western United States and Canada. *Explorations and field-work of the Smithsonian Institution in 1938*, pp. 103-110.
1939b The Folsom problem in American archeology. *Smithsonian Institution Annual Report for 1938*, pp. 531-546.
1940 Excavations at the Lindenmeier site contribute new information on the Folsom complex. *Explorations and field-work of the Smithsonian Institution in 1939*, pp. 87-92.
1941 Latest excavations at the Lindenmeier site add to information on the Folsom complex. *Explorations and field-work of the Smithsonian Institution in 1940*, pp. 79-82.
1942 Archaeological and geological investigations in San Jon district, eastern New Mexico. In *Smithsonian Miscellaneous Collection*, vol. 103, no. 4, Washington.
- Roberts, Frank H.H., Jr.
1943 A new site. *American Antiquity*, vol. 8, no. 3, p. 300.

- 1951 Radiocarbon dates and early man. Radiocarbon dating, *Memoirs of the Society for American Archaeology, American Antiquity*, vol. 17, no. 1, pt. 2, July, pp. 20-22.
- 1961 The Agate Basin complex. In *Homenaje a Pablo Martinez del Rio*. Instituto Nacional de Antropologia y Historia, Mexico.
- Roll, Thomas E.
- 1968 Upper Republican cultural relationships. Master's Thesis, Department of Anthropology, University of Nebraska.
- Rubin, M. and H.E. Suess
- 1954 United States geological survey radiocarbon dates III. *Science*, vol. 123, no. 3194, pp. 442-448.
- Rubin, M. and C. Alexander
- 1960 United States geological survey radiocarbon dates V. *Radiocarbon*, vol. 2, pp. 156-157.
- Ruhe, R.V.
- 1976 Stratigraphy of the midcontinent loess, U.S.A. In *Quaternary Stratigraphy of North America*. W.C. Mahaney, ed. Pp. 197-211. Strodsburg: Dowden, Hutchinson and Ross.
- Rusco, M.K.
- 1960 The white rock aspect. Notebook no. 4, Laboratory of Anthropology, University of Nebraska.
- Russell, Frank
- 1898 Myths of the Jicarilla Apaches. *Journal of American Folklore*, vol. 11, pp. 253-271.
- Rutter, N.W. and C.E. Schweger (editors)
- 1980 The ice-free corridor and peopling of the New World. *Proceedings of the Fifth Biennial Conference of the American Quaternary Assn.*, Edmonton: University of Alberta.
- Sage, Rufus B.
- 1965 Scenes in the Rocky Mountains and in Oregon, California, New Mexico, Texas, and the Grand Prairies. Reprinted in *Far West and Rockies Series*, LeRoy R. and Ann W. Haffen, editors, vols. 4, 5. Glendale, California.
- Satterthwaite, Linton
- 1957 Stone artifacts at and near the Finley site, near Eden, Wyoming. University Museum, University of Pennsylvania, Museum Monographs.
- Saunders, Roger S.
- 1976 A radiocarbon date from the Perry Ranch site, Jackson County, Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 24, no. 6, pp. 3-6.
- Saunders, Roger S., and John T. Penman
- 1979 Perry Ranch: a Plainview bison kill on the southern plains. *Plains Anthropologist*, vol. 24, no. 83, pp. 51-65.
- Sayles, E.B.
- 1935 An archaeological survey of Texas. *Medallion Papers* no. 17, Gila Pueblo, Globe, Arizona.
- Schlesier, Karl H.
- 1972 Rethinking the Dismal River aspect and the plains Athapaskans, A.D. 1692-1728. *Plains Anthropologist*, vol. 17, no. 56, pp. 101-133.
- Schofield, J.M. et al
- 1869 Letter of the Secretary of War, communicating...information in relation to the late Indian battle on the Washita River. Senate Ex. Doc. [U.S.] 40th Cong., 3rd Sess., no. 18. [Includes letters and reports from various military officers, and others, regarding the defeat of Black Kettle's band of Cheyenne.]
- Schroeder, Albert H.
- 1959 A study of the Apache Indians. Part II, the Jicarilla Apaches. Mimeographed. Santa Fe, New Mexico.
- Schultz, C.B.
- 1943 Some artifact sites of early man in the Great Plains and adjacent areas. *American Antiquity*, vol. 8, no. 3, pp. 242-249.
- Schultz, C. Bertrand and L.C. Eiseley
- 1935 Paleontological evidence of the antiquity of the Scottsbluff bison quarry and its associated artifacts. *American Anthropologist*, vol. 37, no. 2, pp. 306-318.
- Scott, Douglas D.
- 1973 Preliminary analysis of location strategies of plains Woodland sites in northern Colorado. *Southwestern Lore*, vol. 39, no. 3, pp. 1-12.

- 1979 A new note on Colorado plains Woodland mortuary practices. *Southwestern Lore*, vol. 45, no. 3, pp. 13-24.
- Scott, D.D. and T.G. Birkedal
1972 The archaeology and physical anthropology of the Gahagan-Lipe site with comments on Colorado Woodland mortuary practices. *Southwestern Lore*, vol. 38, no. 3, pp. 1-18.
- Scott, G.
1963 Quaternary geology and geomorphic history of the Yassler quadrangle, Colorado. United States Geological Survey Professional Paper, 421-A.
- Sellards, E.H., G.L. Evans, and G.E. Meade
1947 Fossil bison and associated artifacts from Plainview, Texas, with descriptions of artifacts by A.D. Krieger. *Bulletin of the Geological Society of America*, vol. 58, pp. 927-954.
- Sellards, E.H.
1952 Early man in America: a study of prehistory. The University of Texas Press, Austin.
1955 Fossil bison and associated artifacts from Milnesand, New Mexico. *American Antiquity*, vol. 20, pp. 336-344.
- Shaeffer, J.B.
1958 The Alibates flint quarry, Texas. *American Antiquity*, vol. 24, no. 2, pp. 189-191.
- Sharp, Jay W.
1969 Archaeology and the southeast corner of the Texas panhandle. *Midland Archeological Society Newsletter*, May, unpaginated, Midland, TX.
- Sharrock, F.W.
1966 Prehistoric occupation patterns in southwest Wyoming and cultural relations with the Great Basin and plains culture areas. *Anthropological Papers*, University of Utah, no. 77.
- Sheridan, P.H.
1869 [Report to General W.T. Sherman of Action of the Military Division of Missouri, Chicago, Illinois, November 1, 1869]
1872 U.S. Army. Military division of the Missouri. Outline description of the posts in the military division of the Missouri. accompanied by tabular lists of Indian superintendencies, agencies and reservations...Chicago. [A second edition was published in 1876 under the same title, but apparently did not include a map.]
- Sheridan, P.H.
1882 Record of engagements with hostile Indians within the military division of the Missouri, from 1868 to 1882. Chicago, Ill.
- Sibley, John, and others
1803? An account of Louisiana: being an abstract of documents, in the offices of the departments of state, and of the treasury. Washington. A compilation made by direction of President Jefferson from information furnished by Dr. John Sibley and others; transmitted to Congress by Jefferson November 14, 1803.
- Sigstad, John
1969 Mowry Bluff artifacts, pottery in two house sites in the central plains: an experiment in archeology. W.R. Wood, editor. *Plains Anthropologist*, Memoir 6, vol. 14, no. 44, pt. 2, pp. 17-23.
- Simmons, Mark
1973 The mysterious A tribe of the southern plains. *Corral de Santa Fe Westerners*, Brandbook 1972. Pp. 73-89. Santa Fe.
- Smith, Carlyle S.
1949a Archeological research at the University of Kansas, 1946-1947. *Proceedings of the Fifth Plains Conference for Archeology*, Notebook 1, pp. 29-30. Laboratory of Anthropology, the University of Nebraska. Lincoln.
1949b Two pottery collections from the state of Kansas. *Proceedings of the Fifth Plains Conference for Archeology*, Notebook 1, pp. 81-84. Laboratory of Anthropology, the University of Nebraska. Lincoln.
1949c Archeological investigations in Ellsworth and Rice counties, Kansas. *American Antiquity*, vol. 14, pt. 1, pp. 292-300.
- Smith, Elmer R.
1941 Archaeology of Deadman Cave, Utah. *Bulletin University of Utah*, vol. 32, no. 4.
- Smith, Shirley and George Agogino
1966 A comparison of whole and fragmentary Paleo-Indian points from Blackwater Draw. *Plains Anthropologist*, vol. 33, no. 11, pp. 201-203.

- Solecki, Ralph
1952 Appraisal of the archeological resources of the Wilson reservoir, Russell County, Kansas, supplement. Missouri Basin Project, Smithsonian Institution, Lincoln.
- Spaulding, Albert C.
1956 The Arzberger site, Hughes County, South Dakota. Occasional Contributions from the Museum of Anthropology, University of Michigan, no. 16. Ann Arbor.
- Stanford, D.
1974 Preliminary report of the excavation of the Jones-Miller site, Yuma County, Colorado. Southwestern Lore, vol. 40, pp. 29-37.
1978 The Jones-Miller site: an example of Hell Gap bison procurement strategy. Plains Anthropologist, vol. 23, no. 82, pt. 2, pp. 90-97. Memoir 14.
- Stanford, Dennis
1979 The Selby and Dutton sites: evidence for a possible pre-Clovis occupation of the high plains. In Pre-Llano cultures of the Americas: paradoxes and possibilities. The Anthropological Society of Washington, Robert L. Humphrey and Dennis Stanford, editors, pp. 101-123.
- Steege, Lou C.
1967 Happy Hollow rock shelter. The Wyoming Archaeologist, vol. 10, no. 2, pp. 11-23.
1968 Happy Hollow rock shelter. The Wyoming Archaeologist, vol. 10, no. 3, pp. 11-23.
- Steen, C.R.
1955 A survey of archeology and history in the Arkansas-White-Red River basins, National Park Service.
- Stein, Martin
1978 A surface survey of the Schmalzried site--14LA305. Kansas Anthropological Association Newsletter, vol. 24, nos. 4-5, pp. 1-11.
- Stephenson, Robert L.
1954 Taxonomy and chronology in the central plains--middle Missouri River area. In: The Plains Anthropologist, no. 1, May, pp. 15-21.
- Sterns, F.H.
1915a A stratification of cultures in eastern Nebraska. American Anthropologist, N.S., vol. 17, pp. 121-127.
1915b The archeology of eastern Nebraska with special reference to the culture of the rectangular earth lodges. Two volumes. Ph.D. thesis on file, Harvard University.
- Steward, Julian H.
1936 Pueblo material culture in western Utah. Anthropological series vol. 3, no. 1, University of New Mexico Bulletin 287. Albuquerque.
- Stieghorst, Junann J. and Betty Bennett
1973 Salvage archaeology at Golden site 5JF12. Southwestern Lore, vol. 39, no. 1, pp. 12-17.
- Stockton, Charles W., and David M. Meko
1975 A long-term history of drought occurrence in western United States as inferred from tree rings. Weatherwise, vol. 28, no. 6, pp. 244-249.
- Strong, W.D.
1932 An archeological reconnaissance in the Missouri valley. Explorations and field-work of the Smithsonian Institution in 1931, pp. 151-158.
1933 The plains culture area in the light of archaeology. American Anthropologist, vol. 35, no. 2, pp. 271-287.
1935 An introduction to Nebraska archeology. Smithsonian Miscellaneous Collections, vol. 93, no. 10.
1940 From history to prehistory in the northern Great Plains. In: Essays in Historical Anthropology of North America. Smithsonian Miscellaneous Collections, vol. 100, pp. 353-394.
- Studer, Floyd V.
1931a Archaeological survey of the north panhandle of Texas. Bulletin of the Texas Archaeological and Paleontological Society, vol. 3, pp. 70-75. (General summary of the types of sites found in the panhandle.)
1931b Some field notes and observations concerning the Texas panhandle ruins. In (Moorehead ed.) Archaeology of the Arkansas River Valley. Pp. 131-142. Phillips Academy, Andover, Mass.
1931c Discovering the panhandle. Panhandle-Plains Historical Review, vol. 4, pp. 7-23.
1934 Texas panhandle culture ruin no. 55. Texas Archaeological and Paleontological Society-Bulletin, vol. 6, pp. 80-96. (Coetas Ruin)

- 1955 Archaeology of the Texas panhandle. *Panhandle-Plains Historical Review*, vol. 28, pp. 87-95.
- Sudbury, Byron
1976 Ka-3, the Deer Creek site, an eighteenth-century French contact site in Kay County, Oklahoma. *Oklahoma Anthropological Society Bulletin*, vol. 24: 1-135.
- Suhm, Dee Ann and Alex D. Krieger, with the collaboration of Edward B. Jelks
1954 An introductory handbook of Texas archaeology. *Bulletin of the Texas Archeological Society*, vol. 25, Austin.
- Sunder, John E., ed.
1960 Matt Field on the Santa Fe trail. Collected by Clyde and Mae Reed Porter. University of Oklahoma Press, Norman.
- Swancara, Frank, Jr.
1955 The archaeology of the Great Sand Dunes National Monument, a preliminary survey. *Southwestern Lore*, vol. 20, no. 4, pp. 53-56.
- Swanton, John R.
1952 The Indian tribes of North America. *Bureau of American Ethnology Bulletin* 145. Smithsonian Institution, Washington, D.C.
- Swedlund, Alan and Linda Goodman
1966 The Witkin burial site. *Southwestern Lore*, vol. 32, no. 3, pp. 70-75.
- Taylor, William Z.
1911 The last battle of the Pawnee with the Sioux. *Collections of the Nebraska State Historical Society*, vol. XVI, pp. 165-167.
- Temple, Wayne C.
1975 Indian villages of the Illinois country, part I, atlas, supplement. *Illinois State Museum Scientific Papers*, vol. I, part 1, supplement. Springfield.
- Thomas, Alfred B.
1931 The first Santa Fe expedition 1792-1793. *Chronicles of Oklahoma*, vol. 9, pp. 195-208.
- Thomas, Alfred B., editor
1929 Documents bearing upon the northern frontier of New Mexico, 1818-1819. *The New Mexico Historical Review*, vol. LV, no. 2, the Historical Society of New Mexico, Santa Fe.
1929 San Carlos on the Arkansas River, 1787. *Colorado Magazine*, vol. VI, May, pp. 79-92.
1932 Forgotten frontiers: a study of the Spanish Indian policy of Don Juan Bautista de Anza Governor of New Mexico 1777-1787. University of Oklahoma Press, Norman.
1935 After Coronado: Spanish exploration northeast of New Mexico, 1696-1727. Norman: University of Oklahoma Press.
1940 The plains Indians and New Mexico, 1751-1778, *Coronado Historical Series*, vol. XI. University of New Mexico Press, Albuquerque.
1941 Teodoro de Croix and the northern frontier of New Spain, 1776-1783. University of Oklahoma Press, Norman.
- Thompson, Ray
in Untitled--a report on the Dye site on a tributary of Mulberry Canyon in Armstrong County,
prep. Texas.
- Tiller, Veronica E. Velarde
1983 The Jicarilla Apache tribe, a history, 1846-1970. University of Nebraska Press, Lincoln.
- Trenholm, Virginia C. and Maurine Carley
1964 The Shoshonis, Sentinels of the Rockies. University of Oklahoma Press, Norman.
- Trenholm, Virginia
1970 The Arapahoes, our people. University of Oklahoma Press, Norman.
- Tucker, Sara Jones
1942 Indian villages of the Illinois country, part I, atlas. *Illinois State Museum Scientific Papers*, vol. II. Springfield.
- Tunnell, Curtis D., and Jack T. Hughes
1955 An archaic bison kill in the Texas panhandle. *Panhandle-Plains Historical Review*, vol. 28, pp. 63-70, Canyon, TX.
1964 Two burials from the Jim Arnold site in northwest Texas. *Bulletin of the Texas Archeological Society*, vol. 35, pp. 83-94.
- Turner, Christy G., II
1980 Appendix I: suggestive dental evidence for Athabaskan affiliation in a Colorado skeletal series. In: *Trinidad Lake Cultural Resource Study*, part II. Caryl E. Wood and Gerald A. Bair. Trinidad Lake Project.

- Twitchell, Ralph E.
1914 The Spanish archives of New Mexico. 2 vols. Cedar Rapids: the Torch Press.
- Tyler, S. Lyman and H. Darrel Taylor
1958 The report of Fray Alonso de Posada in relation to Quivira and Teguayo. *New Mexico Historical Review*, vol. 33, no. 4, pp. 285-314.
- Udden, J.A.
1900 An old Indian village. Augustana Library Publication, no. 2. U.S. Army, Corps of Topographical Engineers
1857 [Exploration from Fort Riley to Bridger's Pass.] House Ex. Doc., 35th Cong., 1st Sess., no. 2. Pp. 455-520. Washington.
- U.S. Bureau of Indian Affairs
1867 ...Letters of the Secretary of the Interior communicating...information touching on origin and progress of Indian hostilities on the frontier. Senate Ex. Doc., 40th Cong., 1st Sess., no. 13. (128 pp.), Washington.
1880 Letter from the Secretary of the Interior transmitting...correspondence concerning the Ute Indians of Colorado. Senate Ex. Doc. 46th Cong., 2nd Sess., no. 31 (274 pp.), Washington.
- U.S. Department of Agriculture
1941 Climate and man. Yearbook of Agriculture. Washington, D.C.
- Upshaw, Emily
1972 Palo Duro rock art: Indian petroglyphs and pictographs. M.A. thesis, West Texas State University, Canyon.
- Wade, W.D.
1966 The Hutcheson burial site. *Southwestern Lore*, vol. 31, no. 4, pp. 74-80.
1971 Burial 1 from Michaud site A. *Plains Anthropologist*, vol. 16, no. 54, pt. 1, pp. 321-323.
- Ware, Captain Eugene F.
1960 The Indian war of 1864. University of Nebraska Press, Lincoln. (Originally published in 1911 by Crane & Company.)
- Warnica, James, and Ted Williamson
1968 The Milnesand site--revisited. *American Antiquity*, vol. 33, pp. 16- 24.
- Warren, G.K.
[1858] Exploration in Nebraska; preliminary report of Lieut. G.K. Warren, Topographical Engineers, to Captain A.D. Humpherys, Topographical Engineers, in charge of Office of Explorations and Surveys, War Department. Washington, D.C. November 24, 1858. In Report of Secretary of War. 35th Cong., 2nd Sess., Senate Exec. Doc. no. 1, Serial 975-76, pp. 620-747.
1875 Preliminary report of explorations in Nebraska and Dakota, in the years 1855-'56-'57. Washington. [Reprint of 1858 report.]
- Watson, Virginia
1950 The Optima focus of the panhandle aspect: description and analysis. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 21, pp. 1-68.
- Weakly, Harry E.
1946 A preliminary report on the Ash Hollow charcoal. In Champe, 1946, pp. 105-110.
1962 Dendrochronology and archeology in Nebraska. *Plains Anthropologist*, vol. 7, no. 16, pp. 138-146.
- Weakly, Ward
1961 Tree-rings and archeology in the central plains. Master's Thesis, Department of Anthropology, University of Nebraska, Lincoln.
- Weber, David J.
1971 The Taos trappers: the fur trade in the far southwest, 1540-1846. University of Oklahoma Press, Norman.
- Wedel, Mildred M.
1972- Claude-Charles Dutisne: a review of his 1719 journeys. *Great Plains Journal*, vol. 12, pp. 4-25, 146-173.
1973
- Wedel, Mildred M.
1974 The Benard de la Harpe historiography on French Colonial Louisiana. *Louisiana Studies*, vol. XIII, no. 1, pp. 9-67.
1979 The ethnohistoric approach to plains Caddoan origins. *Nebraska History*, vol. 60, no. 2, pp. 183-196.
1981 The Deer Creek site, Oklahoma: a Wichita village sometimes called Ferdinandina, an ethnohistorian's view. *Oklahoma Historical Society, Series in Anthropology* 5.

- 1982 The Wichita Indians in the Arkansas river basin. In: Plains Indian studies, D.H. Ubelaker and H.J. Viola, editors. Smithsonian Contributions to Anthropology, no. 30, pp. 118-134.
- Wedel, Waldo R.
- 1934 Preliminary notes on the archaeology of Medicine Valley in southwestern Nebraska. Nebraska History Magazine, vol. XIV, no. 3, pp. 145-166.
 - 1935a Contributions to the archaeology of the upper Republican Valley, Nebraska. Nebraska History Magazine, vol. 15, no. 3, pp. 133-209.
 - 1935b Minneapolis 1: a prehistoric village site in Ottawa County, Kansas. Nebraska History Magazine, vol. 15, no. 3, pp. 210-237. Lincoln.
 - 1935c Salina 1: a protohistoric village site in McPherson County, Kansas. Nebraska History Magazine, vol. XV, no. 3, pp. 239-250.
 - 1935d Reports on field work by the archeological survey of the Nebraska State Historical Society, 1934. Nebraska History Magazine, vol. 15, no. 3, pp. 133-250.
 - 1936 An introduction to Pawnee archeology. Bureau of American Ethnology, Bulletin 112. Washington.
 - 1938 The direct historical approach to Pawnee archeology. Smithsonian Miscellaneous Collections, vol. 97, no. 7. Washington.
- Wedel, Waldo R.
- 1940a Archeological explorations in western Kansas. Explorations and field-work of the Smithsonian Institution in 1939, pp. 83-86.
 - 1940b Culture sequences in the central Great Plains. Smithsonian Miscellaneous Collections, vol. 100, pp. 291-352. Reprinted in Plains Anthropologist, vol. 17, no. 57, pp. 291-352. 1972.
 - 1941a Environment and native subsistence economies in the central Great Plains. Smithsonian Miscellaneous Collections, vol. 101, no. 3, pp. 1-29.
 - 1941b In search of Coronado's "Province of Quivira". Exploration and field-work of the Smithsonian Institution in 1940, pp. 71-74.
 - 1942 Archeological remains in central Kansas and their possible bearing on the location of Quivera. Smithsonian Miscellaneous Collections, vol. 101, no. 7.
 - 1943 Archeological investigations in Platte and Clay counties, Missouri. U.S. National Museum Bulletin 183: 1-244.
 - 1949 Some central plains sherd types from Kansas. Proceedings of the Fifth Plains Conference for Archeology. University of Nebraska, Laboratory of Anthropology, Notebook no. 1, pp. 86-90. Lincoln.
 - 1950 Missouri River basin survey 1948 season. Proceedings of the Sixth Plains Archeological Conference (1948). University of Utah, Department of Anthropology, Anthropological Papers, no. 11, pp. 3-8.
 - 1953a Prehistory and the Missouri Valley development program: summary report on the Missouri River basin archeological survey in 1948. Bulletin of the Bureau of American Ethnology, 154, River Basin Survey Paper 1, pp. 1-60.
- Wedel, Waldo R.
- 1953b Prehistory and the Missouri Valley development program: summary report on the Missouri River basin archeological survey in 1949. Bulletin of the Bureau of American Ethnology, 154, River Basin Survey Paper 2, pp. 65-102.
 - 1954 Earthenware and steatite vessels from northwestern Wyoming. American Antiquity, vol. 19, no. 4, pp. 403-409.
 - 1956 Changing settlement patterns in the Great Plains. In: Prehistoric settlement patterns in the New World, G.R. Willey, editor. Viking Fund Publications in Anthropology, no. 23, pp. 81-92.
 - 1959 An introduction to Kansas Archaeology. Bureau of American Ethnology, Bulletin 174.
 - 1961a Prehistoric man on the Great Plains. University of Oklahoma Press.
 - 1961b Archeological fieldwork in the Missouri River basin in 1948. Plains Archeological Conference Newsletter, vol. 1, Reprint, pp. 94-96.
 - 1963 Cultural stratification at the Lamb Spring site, Colorado. In Abstracts of Papers, Society for American Archaeology, 32nd Annual Meeting. University of Colorado. Boulder.
 - 1967 The council circles of central Kansas: were they solstice registers? American Antiquity, vol. 32, no. 1, pp. 54-63.
 - 1968a After Coronado in Quivira. Kansas Historical Quarterly, vol. 34, no. 4, pp. 369-385.

- 1968b Some thoughts on central plains-southern plains archaeological relationships. *Great Plains Journal*, vol. 7, no. 2, pp. 53-62. Lawton.
- Wedel, Waldo R.
- 1970a Some environmental and historical factors of the Great Bend aspect. In: *Pleistocene and Recent environments of the central Great Plains*. Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publications 3, pp. 131-140.
- 1970b Coronado's route to Quivira, 1541. *Plains Anthropologist*, vol. 15, no. 49, pp. 161-168.
- 1975a Chalk Hollow: culture sequence and chronology in the Texas panhandle. *Actas del XLI Congreso Internacional de Americanistas*, vol. 1, pp. 271-278, Mexico, D.F.
- 1975b Chain mail in plains archeology. *Plains Anthropologist*, vol. 20, no. 69, pp. 187-196.
- 1977 Native astronomy and the plains Caddoans. In *Native American Astronomy*, Anthony F. Aveni, Austin University of Texas Press.
- 1978 Commentary. In: *The central plains tradition, internal development and external relationships*. Donald J. Blakeslee, editor. Report no. 11, Office of the State Archaeologist. The University of Iowa. Iowa City.
- 1979 Some reflections on plains Caddoan origins. *Nebraska History*, vol. 60, no. 2, pp. 272-293.
- 1982 Further notes on Puebloan-central plains contacts in light of archaeology. In: *Pathways to plains prehistory*, D.G. Wyckoff and J.L. Hofman, editors. *Oklahoma Anthropological Society Memoir* 3. Norman.
- Wedel, Waldo R., and Marvin F. Kivett
- 1956 Additional data on the Woodruff ossuary, Kansas. *American Antiquity*, vol. 21, no. 4, pp. 414-416.
- Wedel, W.R. and George Metcalf
- 1962 Excavations near Littleton, Colorado, 1961. In *Paleo-Indian and Archaic Traditions*, Robert E. Bell, Chairman. *Plains Anthropologist*, vol. 7, no. 16, pp. 89.
- Wedel, Waldo R. and Mildred M. Wedel
- 1976 Wichita archeology and ethnohistory. In *Kansas and the west: bicentennial essays in honor of Nyle H. Miller, Forrest Blackburn et al*, editors, Kansas State Historical Society.
- Weltfish, Gene
- 1965 *The lost universe*. Basic Books, Inc., New York.
- Wendorf, Fred
- 1960 The archaeology of northeastern New Mexico. *El Palacio*, vol. 67, no. 2, pp. 55-65.
- 1970 The Lubbock subpluvial. In: *Pleistocene and Recent environments of the central Great Plains*. Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publication 3, pp. 23-26.
- Wendorf, Fred, Alex D. Krieger, Claude C. Albritton and T.D. Stewart
- 1955 *The Midland discovery*. University of Texas Press, Austin.
- Wendorf, Fred and John P. Miller
- 1959 Artifacts from high mountain sites in the Sangre de Cristo range, New Mexico. *El Palacio*, vol. 66, no. 2, pp. 37-52.
- Wendorf, Fred and Alex D. Krieger
- 1959 New light on the Midland discovery. *American Antiquity*, vol. 25, no. 1, pp. 66-78. Salt Lake City.
- Wetherington, Ronald K.
- 1968 Excavations at Pot Creek pueblo. Fort Burgwin Research Center Report no. 6. Fort Burgwin Research Center, Taos.
- Wheat, Carl I.
- 1957 *Mapping the transmississippi west 1540-1861*. 5 vols. Institute of Historical Cartography, San Francisco.
- Wheat, Joe Ben
- 1967 A Paleo-Indian bison kill. *Scientific American*, vol. 216, no. 1, pp. 44-52.
- 1972 The Olsen-Chubbuck site: a Paleo-Indian bison kill. *Society for American Archaeology, Memoir* 26. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1976 Artifact life histories: cultural templates, typology, evidence and inference. *Primitive Art and Technology*, pp. 7-15. Archaeological Association, Department of Archaeology, University of Calgary, Calgary, Alberta, Canada.

- 1978 Olsen-Chubbuck and Jurgens sites: four aspects of Paleo-Indian economy. *Plains Anthropologist*, vol. 23, no. 82, pt. 2, pp. 84-89.
- 1979 The Jurgens site. *Plains Anthropologist*, vol. 24, no. 84, part 2, Memoir 15.
- Wheeler, Richard P.
- 1952 The pre-ceramic subsistence patterns in the Great Plains. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1954 Selected projectile point types of the United States: II. *Bulletin of the Oklahoma Anthropological Society*, vol. 2, pp. 1-6.
- 1957 Duncan and Hanna points. *Plains Anthropologist*, vol. 1, pp. 7-14.
- Whetmore, Alphonso
- 1832 Alphonso Whetmore's report, in Message from the President of the United States...concerning the fur trade, and inland trade to Mexico. [Senate Doc.-U.S.] 22nd Cong., 1st Sess., no. 90. Pp. 30-41.
- Whipple, A.W.
- 1855? Report of explorations for a railway route, near the thirty-fifth parallel of latitude from the Mississippi River to the Pacific Ocean. House Ex. Doc., 33rd Cong., 1st Sess., no. 129. Washington.
- 1865 Reports of explorations ... vol. 3. Senate Ex. Doc. 78, 33rd Congress, 2nd Session, Washington, D.C.
- Wiley, Patrick S., and Jack T. Hughes
- 1975 An archeological survey of an isolated section in Lake Theo State Park, Briscoe County, Texas, report submitted to the Texas Parks and Wildlife Department by the Archeological Research Laboratory, West Texas State University, Canyon.
- Wiley, P.S., B.R. Harrison and J.T. Hughes
- 1978 The Rex Rodgers site. In: *Archeology at MacKenzie Reservoir*, edited by J.T. Hughes and P.S. Wiley, pp. 51-114. Texas Historical Commission, Office of the State Archeologist, Archeological Survey Report no. 24.
- Williston, S.W.
- 1899 Some prehistoric ruins in Scott County, Kansas. *Kansas University Quarterly*, Series B, vol. 7, no. 4, pp. 109-114.
- 1902 An arrowhead found with bones of bison occidentalis Lucas, in western Kansas. *American Geologist*, vol. 30, pp. 313-315.
- Williston, S.W., and H.T. Martin
- 1900 Some pueblo ruins in Scott County, Kansas. *Kansas Historical Collections*, vol. 6, pp. 124-130.
- Wilmsen, Edwin N. and Frank H.H. Roberts, Jr.
- 1978 Lindenmeier, 1934-1974: concluding report on investigations. *Smithsonian Contributions to Anthropology*, no. 24.
- Wilson, Gilbert L.
- 1934 The Hidatsa earthlodge. *American Museum of Natural History, Anthropological Papers*, vol. 33, pt. 5. New York.
- Wilson, L.R.
- 1966 Palynology of the Domebo site. In *Domebo: a PaleoIndian mammoth kill in the prairie-plains*, Frank C. Leonhardy, ed., pp. 44-50. *Contributions of the Museum of the Great Plains* no. 1, Lawton.
- Windmiller, Ric
- 1974a Archaeological investigations in the Two Forks Reservoir area, Colorado, first progress report. Report on file, Midwest Archeological Center, National Park Service, Lincoln, NE.
- 1974b Archaeological investigations in the upper South Platte River drainage, Colorado. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 87-97.
- 1975 Archaeological investigations in the Two Forks Reservoir area, Colorado, second progress report. Report on file, Midwest Archeological Center, National Park Service, Lincoln, Nebraska.
- Winship, George P.
- 1896 The Coronado expedition, 1540-1542. *Bureau of American Ethnology, Annual Report*, vol. 14, pp. 329-613.
- Wiseman, R.N.
- 1972 The Puerto del Sur Project: archaeologist salvage excavations along Interstate 25 near Las Vegas, New Mexico. *Museum of New Mexico, Laboratory of Anthropology Notes*, no. 70, Santa Fe.

- 1975 Sitio Creston (LA 4939), a stone enclosure site near Las Vegas, New Mexico. *Plains Anthropologist*, vol. 20, no. 68, pp. 81-104.
- Withers, A.M.
1954 University of Denver archaeological fieldwork. *Southwestern Lore*, vol. 19, no. 4, pp. 1-3.
- Witte, Adolph H.
1942 Certain caches of flints from the north Texas area. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 14, pp. 72-76.
1947 Certain archaeological notes on the high plains of Texas. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 18, pp. 76-82.
1955 A double Indian burial from Donley County, Texas. *Panhandle-Plains Historical Review*, vol. 28, pp. 82-86, Canyon, TX.
- Witty, T.A., Jr.
1962 Archaeological investigations of the Hell Creek valley in Wilson Reservoir, Russell and Lincoln counties, Kansas. *Kansas State Historical Society Anthropological Series* no. 1. Topeka.
1965 Ten additional radiocarbon dates from archeological sites in Kansas. *Kansas Anthropological Association Newsletter*, vol. 10, nos. 7-9, pp. 9-10.
1966 The West Island site, 14 PH 10, a Keith focus plains Woodland site in Kirwin Reservoir, Phillips County, Kansas. *Plains Anthropologist*, vol. 11, no. 32, pp. 127-135.
1967 1966 excavations at the Kansas Monument site, 14RP1. *Plains Anthropologist*, vol. 12, no. 36, p 218. Lincoln.
1969 The Caldwell dig. *Kansas Anthropological Association Newsletter*, vol. 15, no. 2, pp. 1-3.
1971a Archeology and early history of the Scott Lake State Park area. *Kansas Anthropological Association Newsletter*, vol. 16, no. 5, pp. 1-5.
1971b Reconstruction of the Scott County pueblo ruins. *Kansas Anthropological Association Newsletter*, vol. 16, no. 8, pp. 1-3.
- Witty, T.A., Jr.
1975 Report of the 1975 Lake Scott Kansas Anthropological Association dig and Kansas archeology training school activities. *Kansas Anthropological Association Newsletter*, vol. 21, nos. 1-2, pp. 1-9.
1978 Along the southern edge: the central plains tradition in Kansas. In *The central plains tradition: internal development and external relationships*, edited by D.J. Blakeslee, pp. 56-66. The University of Iowa, Office of the State Archaeologist, report no. 11. Iowa City.
- Wood, Caryl E., and Gerald A. Bair
1980 The prehistoric occupation of the upper Purgatoire River valley, southeastern Colorado. *Trinidad Lake Cultural Resource Study*, part II. Trinidad Lake Project.
- Wood, John J.
1964 Excavations at two Woodland sites in Arapahoe County, Colorado. Unpublished MS, Department of Anthropology, University of Colorado, Boulder.
- Wood, J.J.
1967 Archeological investigations in northeastern Colorado. MS, PhD dissertation, University of Colorado, Boulder. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1971 Excavations at two Woodland sites in Arapahoe County, Colorado. *Plains Anthropologist*, vol. 16, no. 54, pp. 311-320.
- Wood, W. Raymond
1969a Two house sites in the central plains: an experiment in archaeology. *Plains Anthropologist*, vol. 14, no. 44, pt. 2 (Memoir 6).
1969b The Mowry Bluff site, 25 FT 35: architecture. In: *Two house sites in the central plains: an experiment in archaeology*, edited by W.R. Wood, pp. 6-10. *Plains Anthropologist*, Memoir 6. Lawrence.
- Wood, W. Raymond
1969c A contrastive statement on upper Republican and Nebraska: Ethnographic reconstructions. In: *Two house sites in the central plains: an experiment in archaeology*, edited by W.R. Wood, pp. 102-108. *Plains Anthropologist*, Memoir 6. Lawrence.
1969d Conclusions. In: *Two house sites in the central plains: an experiment in archaeology*, edited by W.R. Wood, pp. 109-111. *Plains Anthropologist*, Memoir 6. Lawrence.
1971 Pottery sites near Limon, Colorado. *Southwestern Lore*, vol. 37, no. 3, pp. 53-85.
- Wood-Simpson, Caryl
1976 Trinchera Cave: a rock shelter in southeastern Colorado. Unpublished MA thesis, Depart-

ment of Anthropology, University of Wyoming. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Word, James H.

- 1965 The Montgomery site in Floyd County, Texas. South Plains Archeological Society Bulletin, vol. 2, pp. 55-102, Floydada, TX.

Wormington, H.M.

- 1957 Ancient man in North America. 4th edition, Denver Museum of Natural History, Popular Series no. 4. Denver, CO.

Wormington, H.M. and Richard Forbis

- 1965 An introduction to the archaeology of Alberta, Canada. Denver Museum of Natural History, Proceedings no. 11.

Wormington, H.M. and R.H. Lister

- 1956 Archaeological investigations on the Uncompahgre plateau in west-central Colorado. Proceedings no. 2, Denver Museum of Natural History. Denver.

Wright, Welty

- 1940 The type, distribution, and occurrence of flint gravers in Texas. Bulletin of the Texas Archaeological and Paleontological Society, vol. 12, pp. 31-48.

Wyckoff, Don G. and Lyonel Taylor

- 1971 The Pumpkin Creek site: an early archaic camp on the southern plains border. Plains Anthropologist, vol. 16, no. 51, pp. 20-51. Lincoln.

Zimmerman, Jorn

- 1971 Projectile point provenience. In: Archaeological investigations at the Wilbur Thomas shelter, Carr, Colorado, assembled and edited by David A. Breternitz. Southwestern Lore, vol. 36, no. 4, pp. 80-82.

The following bibliographies, by no means exhaustive for the central High Plains, includes items of potential use of archeologists working in the area. Most of the items were not examined by the present author but were gleaned from the bibliographies of references used, and from lists provided by various archeologists who have worked in the area. The assignment of items to the various categories has been based primarily on the title, which in some cases could be misleading. Obviously, some items could be included in several categories, but have been put in what would seem to be the most useful one for archeologists. Hopefully, this ordering will facilitate locating and using the references. Items in REFERENCES CITED, nearly all of which are used in the text, are not included in the Supplemental Bibliographies.

COLORADO ARCHEOLOGICAL REPORTS

- Adams, E. Charles, Jenny L. Adams and David A. Breternitz
 1974- Archaeological Survey for the proposed Hayden-Ault 345 KV right of way. Vol. 1. Report on
 1975 file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Vol. 2 - Tests of
 2 sites along the proposed route. Vol. 3 - sketch maps of locations. Report on file, Office of the
 State Archaeologist, Colorado Heritage Center, Denver.
- Adkins, Frank
 1978 Review of The Mount Albion Complex: a study of prehistoric man and the altithermal by
 James Benedict and Byron Olson. All Points Bulletin, Denver Chapter Colorado Archae-
 ological Society, vol. 15, no. 9, pp. 2-7.
- Agogino, George A. and Al Parrish
 1971 The Fowler-Parrish site: a Folsom campsite in eastern Colorado. Plains Anthropologist, vol.
 16, no. 52, pp. 111-116.
- Anderson, Jane
 1972 Red Top Ranch - high plains: southeastern Colorado: archaeological survey and testing pro-
 gram - a techno-functional analysis of the flaked lithic materials from Woodland period sites.
 Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1977 Broomfield water treatment facility. Proposed settling lagoons. Cultural Resource Inventory
 Report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1977 Proposed #6 chair lift for the Clear Creek Skiing Corporation. Cultural Resource Inventory
 Report for Pioneer Archaeological Consultants, Longmont, Colorado.
 1979 Breckenridge-Malta 230kV transmission line for Public Service Co. of Colorado: 15 pro-
 posed tower locations. Archaeological Survey. Report on file, Office of the State Archae-
 ologist, Colorado Heritage Center, Denver.
 1980 Basalt-Malta transmission line: Cultural Resource Inventory (Lake, Pitkin and Eagle coun-
 ties). Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Anderson, Jane L. and Joseph J. Lischka
 1979 Dawson Park, Longmont, Colorado: Archaeological Survey. Pioneer Archaeological Con-
 sultants. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1979 Spangler Park, Longmont, Colorado: Archaeological Survey. Pioneer Archaeological Con-
 sultants. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Anderson, Jane L. et al
 1979 Heil Ranch, C & M Industries: cultural resource inventory of portions of, Pioneer Archae-
 ological Consultants. Report on file, Office of the State Archaeologist, Colorado Heritage
 Center, Denver.
- Anderson, Morris
 1975 Bennett Creek timber sale, Upper Jacks Gulch Timber Sale. MS on file, Office of the State
 Archaeologist of Colorado, Denver.
 1975 Elk Creek timber sale, Arapaho-Roosevelt National Forest. Preliminary Cultural Resource
 Inventory Report for Office of the State Archaeologist of Colorado, Denver.
 1975 Kaufman Creek timber sale. MS on file, Office of the State Archaeologist of Colorado,
 Denver.
 1975 Little King land exchange, Arapaho National Forest. Preliminary Cultural Resource Inven-
 tory Report for the Office of the State Archaeologist of Colorado, Denver.
 1975 North Webber timber sale, Roosevelt National Forest. MS on file, Office of the State Ar-
 chaeologist of Colorado, Denver.
 1975 Willow Creek Pass timber sale. MS on file, Office of the State Archaeologist of Colorado,
 Denver.
 1975 Winter Park land exchange, Arapaho National Forest. Preliminary Cultural Resource Inven-
 tory Report for the Office of the State Archaeologist of Colorado, Denver.

- Anderson, Morris and K. Kranzush
1975 Vasquez Creek timber sale, Arapaho-Roosevelt National Forest. Preliminary Cultural Inventory Report for the Office of the State Archaeologist of Colorado, Denver.
- Anderson, Morris K. and Burton D. Williams
1975 Joe Wright Reservoir, Arapaho National Forest. Final Report of Cultural Resource Inventory, an impact report submitted to the city of Fort Collins, Colorado and to the U.S. Forest Service.
- Anderson, Morris R. and David M. Hall
1977 A reconnaissance survey of archeological and historical site densities in six alternative flood control closures on Fountain Creek, Pueblo County, Colorado.
- Anderson, Morris R., David M. Hall and Gerald A. Bair
1977 Fountain Creek flood control project: reconnaissance survey of archaeological and historical site densities in six alternative flood control closures on Fountain Creek. MS on file at Environmental Research Section, Albuquerque District Corps of Engineers. Also on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Anonymous
1959 Excerpts from geology report on Red Willow Dam. MS on file, Bureau of Reclamation, Region 7, McCook, Nebraska. Provided by Charles Osborne.
n.d. Archaeological survey of state highway 50 east of Canon City. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Army Corps of Engineers and Bureau of Land Management
1979 Spinney Mountain Reservoir water supply project regulatory permits: Draft Environmental Statement. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Arthur, Christopher, Gregory Holmes, Ronald Kainer, Kevin Jones, and Calvin Jennings
1979 Archaeological reconnaissance of the west-east natural gas pipeline, Rio Blanco, Moffat, Routt, Grand and Summit counties, Colorado. Reports of the Laboratory of Public Archaeology no. 27, Colorado State University, Fort Collins.
- Bair, Gerald A.
1980 Trinidad Reservoir report. In preparation for the Interagency Archeological Services--Denver.
- Bair, Gerald A., Morris R. Anderson, David M. Hall, and M. Carla Latuda
n.d. The prehistoric occupation of the upper Purgatoire River, southeastern Colorado. (Part II in preparation.)
- Baker, Galen R.
1967 Excavations in the Trinidad Flood Water Reservoir, 1963-65. MS on file, National Park Service, Midwest Region, Lincoln.
n.d. Pasture 12-Pipeline and 30' tank and pasture #24 and square overflow pit: Pike and San Isabel National Forests: Comanche National Grassland. Cultural Resource Survey Report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Baker, Steven G.
1976 Mill Switch timber sale (selected portions): Gunnison National Forest. Preliminary Cultural Resource Inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1979 Amax Exploration, Inc.: Quartz Creek exploratory drill site, San Juan National Forest: Cultural Resource Inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Beaubien, Paul
1931 Archaeology of the high plains in Colorado. Master's Thesis, University of Denver, Denver, Colorado. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Benedict, James B.
1969 Grant no. 4935-Penrose Fund (1968), \$1500. Aerial photography and mapping of the Rollins Pass site, Colorado. Yearbook of the American Philosophical Society, pp. 504-506.
1970 Prehistoric man and environment in the Colorado front range: excavations during the 1970 field season. MS on file at U.S.D.A. Forest Service, Boulder.
1972 Prehistoric man and environment in the Colorado front range: excavations during the 1971 field season. Progress Report to the U.S. Forest Service, on file at U.S.D.A. Forest Service, Boulder.
1972 Prehistoric man and environment in the Colorado front range: field work during the summer of 1972. Progress Report to the U.S. Forest Service, on file at U.S.D.A. Forest Service, Boulder.

- 1973 Prehistoric man and climate: the view from timberline. Abstract submitted to the IX International Quaternary Congress, Christchurch, New Zealand.
- 1973 Prehistoric man and environment in the Colorado front range: field work during the summer of 1973. Progress Report to the U.S. Forest Service, on file at U.S.D.A. Forest Service, Boulder.
- 1974 Early occupation of the Caribou Lake site, Colorado front range. *Plains Anthropologist*, vol. 19, no. 63, pp. 1-4.
- 1975 Prehistoric man and climate: the view from timberline. In *Quaternary Studies*, edited by R.P. Suggate and M.M. Cresswell, pp. 67-74. The Royal Society of New Zealand, Wellington.
- Benedict, James B.
n.d. Early occupation of the Caribou Lake site, Colorado front range. MS submitted to *Plains Anthropologist*, 1973.
- Benedict, James B., and Byron L. Olson
n.d. Origin of the McKean Complex: evidence from timberline. MS submitted to *Plains Anthropologist*, 1973.
- Berthoud, E.
1872 Ancient remains in Colorado. In *Annual Report of the Board of Regents of the Smithsonian Institution*, 1867, pp. 403-404. U.S. Government Printing Office, Washington, D.C.
- 1873 Antiquities on the Cache la Poudre River, Weld County, Colorado Territory. In *Annual Report of the Board of Regents of the Smithsonian Institution*, 1871, pp. 402-403. U.S. Government Printing Office, Washington, D.C.
- Biggs, Robert W.
1977 Dike mountain unit #5-19, proposed, Atlantic Richfield: Cultural Resources Survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Blair, Barbara A.
1980 West of Trinidad reservoir: the proposed widening and realignment of Colorado highway 12. Colorado Dept. of Highways, Highway Salvage Report #34.
- Bourdeau, Alex et al
1980 Bear Creek Lake area: cultural overview - draft report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Boyd, Rebecca J.
1979 Chatfield dam and lake: cultural resources survey of a proposed erosion control project. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Brechtel, James M.
1979 Maysville mining district: historic sites survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1979 Natural Gas Pipeline Co. of America: high plains pipeline (proposed). Cultural Resource Investigation. Powers Elevation Co. Archaeological Division. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Breternitz, David A.
1969 Archaeological appraisal of proposed West Bijou, East Bijou, and Big Muddy reservoirs, Arapahoe and Adams counties, Colorado. Report on file: National Park Service, Midwest Archeological Center, Lincoln, Nebraska; Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1970 Archaeological appraisal of proposed Agate dam and reservoir, Elbert County, Colorado. Report submitted to National Park Service, Midwest Region, Omaha. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Breternitz, David A., Terje G. Birkedal, Daniel W. Martin, and Douglas D. Scott
1970 Archaeological tests at four sites within the proposed West Bijou, East Bijou, and Big Muddy reservoirs, Arapahoe and Adams counties, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Breternitz, D.A., A.C. Swedlund, and D.C. Anderson
1971 An early burial from Gordon Creek, Colorado. *American Antiquity*, vol. 36, pp. 170-182.
- Breternitz, David A., et al
1973- Bureau of Land Management lands along the front range (Larimer, Boulder, Gilpin, Clear
1974 Creek and Jefferson counties): archaeological reconnaissance. Memorandum: final report, 1974. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Buckles, William G.
1968 Archaeology in Colorado: historic tribes. *Southwestern Lore*, vol. 34, no. 3, pp. 53-67.

- 1971 The Uncompahgre complex: historic Ute archaeology and prehistoric archaeology on the Uncompahgre plateau in west-central Colorado. Unpublished Ph.D. dissertation, Department of Anthropology, University of Colorado, Boulder.
- 1973 Archaeological salvage for the Fryingpan-Arkansas project in Lake, Chaffee and Pitkin counties, Colorado in 1972. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1974 The 1973 archaeological survey of the proposed alignment of the Fountain Valley conduit, Fryingpan-Arkansas project, Bureau of Reclamation in Fremont and El Paso counties, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Also on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Buckles, William G.
- 1975 Mt. Elbert-Poncha transmission line, Fryingpan-Arkansas project: 1973 archaeological investigations of the proposed alignment. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1975 Archaeological survey of the proposed Mt. Elbert-Malta transmission line, Fryingpan-Arkansas project in Lake County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1975 Archaeological investigations in 1973 in the proposed alignment of the Mt. Elbert-Poncha transmission line project, Bureau of Reclamation in Lake and Chaffee counties, Colorado. MS, Laboratory of Anthropology, Southern Colorado State College, Pueblo.
- 1975 Nash land exchange: archaeological surveys in Fremont and Park counties. Also BLM land in Chaffee County, and alignment for Thatcher pipeline in Pueblo County. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1975 Ordway (city of): water treatment system and related features: cultural resources reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 General American Oil Co.: drill site federal #1-6 and access road: cultural resource survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1979 Huerfano County airport: proposed runway expansion: cultural resource investigations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Buckles, William G.
- 1979 San Luis: emergency flood control features in the vicinity: archaeological survey and recommendations concerning cultural resources discovered. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- n.d. Archaeological investigations in 1973 in the proposed alignment of the Mt. Elbert-Poncha transmission line project, Bureau of Reclamation in Lake and Chaffee counties, Colorado. MS, Laboratory of Anthropology, Southern Colorado State College, Pueblo.
- n.d. 1973 archaeological survey of the Fountain Valley conduit, Fryingpan-Arkansas project, Bureau of Reclamation in Fremont and El Paso counties, Colorado. MS, Laboratory of Anthropology, Southern Colorado State College, Pueblo.
- Buckles, William G., ed.
- 1978 Fryingpan-Arkansas project: anthropological investigations near the crest of the continent, 1975-1978. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Buckles, William G., Bruce R. Miller and Mary P. Rossillon
- 1976 24th street extension: between Pueblo Blvd. and the Atchison, Topeka and Santa Fe railroad: cultural resource survey. For Nelson Haley, Patterson and Quirk. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Bureau of Reclamation
- 1978 Fountain Valley conduit: Fryingpan-Arkansas project. Supplement to the final environmental statement. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Burgess, Robert J.
- 1977 Owl Canyon pinyon grove: study of age and archaeology. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Burgh, Robert F.
- 1947 Preliminary report on archeological and paleontological remains in reservoir areas of the Colorado-Big Thompson project, northern Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.

- Burney, Michael S., Thomas J. Lennon and Mark E. Sullivan
 1978 Highlands Ranch: vol. 1 - cultural resource inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver. 1978 Kit Carson County airport (site 1) (proposed), Burlington Co.: Cultural resource inventory for the city of Burlington and the county of Kit Carson. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Burney, Michael S. and Thomas J. Lennon
 1979 Amax, Inc. Mount Emmons project area: Amax utility corridor project study area. Vol. 1 - Identification of cultural resource information report. Vol. 2 - Appendix 1. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Burney, Michael, Carol Coe, Collette Colle, and Thomas Lennon
 1979 An archaeological study of aboriginal sites within the Windy Gap dam reservoir and pipeline project near Granby, Grand County, Colorado. Final Report (2 vols.), Western Cultural Resource Management, Inc., Boulder.
- Burns, John E.
 1968 Rollins Pass: evaluation of proposal by the Institute of Arctic and Alpine Research, University of Colorado, Boulder, to conduct archaeological excavations. Multiple use survey prepared by John E. Burns. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Campbell, Robert G.
 1963 Test excavation of Medina rock shelter, Chacuaco Creek canyon. Southwestern Lore, vol. 29, no. 3, pp. 53-60.
 1969 Prehistoric panhandle culture on the Chaquaqua plateau, southeast Colorado. Ph.D. dissertation, University of Colorado.
 1969 Dating prehistoric rock art of southeastern Colorado. Southwestern Lore, vol. 35, no. 1, pp. 1-10.
- Cannon, George
 1878 Antiquities of Jefferson and Clear Creek counties, Colorado. In Annual Report to the Board of Regents of the Smithsonian Institution, 1877, pp. 236-238. U.S. Government Printing Office, Washington, D.C.
- Carmack, Harry D.
 1979 Missouri Hill timber sale: Pike and San Isabel National Forest. Archeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1979 Miller Gulch timber sale (proposed), Pike and San Isabel National Forest: South Platte district. Archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Cartledge, Thomas R.
 1976 Horsetooth reservoir: off-road vehicle area: cultural resource survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Cassells, E. Steve
 1978 Archuleta Creek drainage: 5 archaeological surface sites, Gunnison National Forest, Cebolla district. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1978 Divide timber sale, Gunnison National Forest: Cebolla district. Cultural resource survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1979 Loveland: Winona recreation property: cultural resource survey for Dept. of Parks and Recreation, Colorado. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1979 Rocky Flats Co. plant property: cultural resource survey (for Joe Lischka). Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Colle, Collette
 1978 Arkansas canyon: two quarry sites (project no. C31-0050-02, highway salvage report no. 23): Archaeological test (for John D. Gooding). Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Colorado Dept. of Highways and Federal Highway Adm.
 1978 Centennial Parkway project IXFCU 470-1(1) (C-470: 1 25 W and N. to Jct. 1-70: Arapahoe, Denver, Douglas and Jefferson counties. Draft and final environmental impact statements. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1980
- Colorado Department of Highways
 1979 Parker road, south (SH 83), from SH 88 to Franktown: (project FC 083-1(7) cultural resource

- report for historical resources. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1980? I-25 east (project FC 014-2 (3)). Cultural resources report for historical resources. For the Federal Highway Administration. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Colorado OSAC and U.S. Forest Service
- 1976 Gunnison National Forest. Cultural resource inventories (preliminary) for: Dyke Creek small sale, Mill Switch timber sale (selected portions), Power Line small sale, Upper Red Creek sale. Site reports. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Colorado Resource Conservation and Development Project
- 1979 Sangre de Cristo resource conservation and development area: plan of action 1980FY. USDA Soil Conservation Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Colorado Springs Planning Department
- 1978 The Shooks Run inventory of historic sites. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Dangler, Terry, Marilyn Armagast, and Vince Spero
- 1977 Rio Grande National Forest: cultural resource inventory, 1975-1976. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Dick, Herbert W.
- 1954 Trinidad State Junior College archeological fieldwork, 1952-1953. Southwestern Lore, vol. 19, no. 1, pp. 4-5.
- 1963 Preliminary report: Trinidad reservoir, Las Animas County, Colorado. MS on file, National Park Service, midwest region, Lincoln, Nebraska.
- 1974 Surface survey of Indian camps on the Blanca Wildlife Habitat-San Luis Valley, Colorado, Fish and Wildlife Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1976 Road cut: Rio Grande National Forest; archaeological survey, for Davis Engineering Service, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Dondelinger, N.W. and R.M. Tatum
- 1942 Preliminary survey of sites in Las Animas County, Colorado. Southwestern Lore, vol. 8, no. 1, pp. 2-6.
- 1944 Stone images in southern Colorado. American Antiquity, vol. 10, no. 1, pp. 59-64.
- Eddy, Frank W.
- 1975 Two Forks reservoir area: archaeological inventory, and investigations. First quarterly progress report, and second progress report. Reports on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Eddy, F.W., A.I. Gerstle, T.J. Lennon, M.E. Sullivan, J.W. Ware and R. Windmiller
- 1975 An archaeological study of aboriginal settlements and land use in the Colorado foothills. MS on file, National Park Service, Denver, Interagency Archeological Services Division.
- Eddy, Frank and Ric Windmiller
- 1975 Two Forks: an archaeological study of settlement and land use in the Colorado foothills. Paper delivered at the 40th annual meeting, Society of American Archaeology, Dallas, Texas.
- Edson, Joe and Don Gabriel
- 1979 Clark site (5MR389) - preliminary site report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Engleman, Craig A. and Sandy Shea
- 1980 North Sheridan Blvd. expansion project along the Jefferson-Adams county line. Vol. 1 - cultural resource inventory report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Fay, George E.
- 1969 Weld County: archaeology survey. Museum of Anthropology of Colorado State College. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Federal Highway Administration and Colorado Division of Highways
- 1979 Parker road (project FC 083-1(7)): SH83 from SH88 to Franktown, Arapahoe and Douglas counties. Draft environmental impact statement. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1979- Centennial Parkway project (IXFCU 470-1(1)): cultural and recreational resources plan: section 4 (f) statement (C-470: 1 25 W. and N. to Jct. I-70): Arapahoe, Denver, Douglas and Jeffer-

- son counties. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Fenenga, Franklin
1951 Appraisal of the archeological and paleontological resources of the Narrows Reservoir, Morgan County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Flayharty, R.A.
1972 T-W-Diamond, a tipi ring site in northern Colorado. Unpublished Master's thesis, Colorado State University.
- Flayharty, R.A. and Elizabeth A. Morris
1972 Abstract of the T-W-Diamond site, a stone ring locality in north-central Colorado. Abstracts of Papers, p. 22. 37th annual meeting, Society for American Archaeology, Bal Harbour, Florida.
- Foster, Michael
1976 Final report of cultural resource inventories, Arapaho-Roosevelt National Forests. Fort Collins, Colorado, fiscal years 1975, 1976. Colorado State Historical Society and U.S.D.A. Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Freedman, Matthew S.
1977 Archaeological reconnaissance of six oil well locations. Laboratory of Public Archaeology, Colorado State University.
- Fritz, W.C. and Bernice Fritz
1940 Evidence of the Folsom culture in the sand dunes of western Texas. Bulletin of the Texas Archeological and Paleontological Society, vol. 12, pp. 217-222. Abilene.
- Gebhard, P.H.
1943 The excavation of an archaeological site on the Purgatoire River. Papers of the Excavators' Club, vol. 2, no. 2. Cambridge.
- Gebhard, Paul H.
1949 An archaeological survey of the blowouts of Yuma County, Colorado. American Antiquity, vol. 15, no. 2, pp. 132-143.
- Gillio, David A., Douglas D. Scott and E. Charles Adams
1973 Spinney Mountain project. Army Corps of Engineers. Vol. 1, 2 and 3. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Gooding, John D.
1977 The archaeological survey of the proposed Powers Boulevard corridor in Colorado Springs. Colorado Division of Highways project number M-7780(1). Highway salvage report no. 18. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Gooding, John D. and O.D. Hand
1977 Archaeological survey of the Arkansas Canyon (between Canon City and Coaldale). Salvage report # 17. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Gooding, John D. and Susan Kreuser
1980 An archaeological survey of forest highway 7. Colorado Department of Highways, Highway salvage report no. 31. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Gordon, E.K.
1975 Archaeological inventory of Crystal Lakes land transfer, Roosevelt National Forest. Office of the State Archaeologist of Colorado, Denver.
1976 A lift area, Union Bowl, Copper Bowl, I-1 lift area and extension O lift area, 17 Glade, 37 Glade, 22-33-27 area. Cultural resource inventory report for Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- Gordon, E. Kinzie
1978 Crystal Exploration and Production Co. well #32-13 federal location and access roads: cultural resource inventory. Bureau of Land Management. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1979 Nederland municipal water distribution system renovation and improvement project. Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- Gordon, E.K. and K.J. Kranzush
1975 Northfield line rebuild for city of Colorado Springs, Dept. of Public Utilities, electric transmis-

- sion and distribution division: cultural resource inventory report. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1976 Allenspark water distribution system for Wright-McLaughlin engineers. Cultural resource inventory report for Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- 1977 Bronco Creek archaeological survey. Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- 1977 Chicken Park timber sale and Chicken Park extension timber sale, Redfeather District Roosevelt National Forest. Cultural resource inventory report for Gordon and Kranzush Archaeological Consultants, Inc., Boulder. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1977 Cow Creek timber sale, Redfeather District Roosevelt National Forest. Cultural resource inventory report for Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- 1977 Giggey Ranch timber sale. Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- Gordon, E.K. and K.J. Kranzush
- 1977 Neighborhood treatment plant site "E", neighborhood treatment plant site "M", Lagoon site, sewage interceptor route, Three Lakes water and sanitation district. Cultural resource inventory report for Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- 1977 Sommerville Table archaeological survey and assessment (SF 18-CO-050-77-2). Site inventory record. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1977 Storm Mountain timber sale: cultural resource survey. Roosevelt National Forest. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Evaluation of 5LR549 Dunraven Glade road, Roosevelt National Forest. Gordon and Kranzush Archaeological Consultants, Inc., Boulder. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Upland Industries land exchange, Redfeather District, Roosevelt National Forest. Gordon and Kranzush Archaeological Consultants, Inc., Boulder.
- Gordon and Kranzush, Archaeological Consultants
- 1977 Boxelder Creek Watershed project, structure B-2 area: cultural resource inventory report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Gordon and Kranzush, Inc.
- 1979 Cyprus Mines Corporation: Hansen project. Archaeological survey. Paleontological report by Paleontological Associates, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Gordon, E. Kinzie, Kris J. Kranzush and Michael Nowak
- 1975 Amity Watershed project: Amity canal - 2 sections in Prowers County: Cultural resource inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1975 Sedwick-Sand Draws Watershed project: cultural resource inventory report. Site reports. USDA Soil Conservation Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Grant, Marcus
- 1977 Elkhorn Creek site preliminary survey and recommendations. MS on file, U.S.D.A. Forest Service, Fort Collins, Colorado.
- 1978 A general overview of the archeology of the Cache la Poudre river, northern Colorado front range, Arapaho-Roosevelt National Forest land use planning office. MS on file at U.S.D.A. Forest Service, Fort Collins, Colorado.
- 1978 Preliminary reconnaissance of threatened archaeological resources in the Lower Poudre canyon, Larimer County, Colorado. Prepared for the Office of the State Archaeologist of Colorado and the U.S. Forest Service. MS on file at U.S.D.A. Forest Service, Fort Collins. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1980 Test excavations at Starlite Ridge site: the proposed expansion of the Crosby gravel pit. Colorado Department of Highways. Colorado Highway Salvage Report #32.
- 1980 Pawnee National Grasslands: Arapahoe and Roosevelt National Forests. Prehistoric and historic settlement and cultural ecology. Western cultural resource management, Inc. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Greiser, Sally T.
- 1977 Adams, Arapahoe, Morgan, Washington counties: archaeological and historic resource sum-

- mary. Harmon, O'Donnell and Henninger Associates, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Greiser, T. Weber
1976 Homestakes Mining Company, uranium division: pitch uranium project. Gunnison National Forest: Archaeological survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Guthrie, Mark
1978 Cultural resource inventory of specified area within Shadow Mountain recreation area, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1979 Four Mile historic park: a proton magnetometer survey of a specified area within. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Halasi, Judith A.
1978 Wyoming Mineral Corporation: Keota (Buckingham-Keota) uranium solution mine project: environmental report. Vol. 1: technical report. Vol. 2: appendices. Archaeological Associates, Inc. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1979 Wheatridge, Colorado: northwest Lakewood sanitation district project on Clear Creek: cultural resources inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Halasi, Judith A. and Hannah Huse
1978 Buckingham-Keota uranium solution mining project (proposed): inventory of the archaeological and historical resources. Archaeological Associates, Inc. for Wyoming Mineral Corporation. Site reports. USDA Forest Service. 2 vols. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Halla, Michael E.
1980 Fort Carson, Co.: draft environmental impact statement training land acquisition. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Hand, O.D.
1977 Present status of the archeological and historic site survey within the Corps of Engineers Trinidad Lake flood control project, Las Animas County, Colorado. MS on file with Interagency Archaeological Services/Denver. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Hand, O.D., Carla Latuda, and Gerald A. Bair
1977 Trinidad Lake cultural resource study, part 1. An evaluative survey of historic and archeological sites within the Corps of Engineers Trinidad Lake flood control project, Las Animas County, Colorado. MS on file, Laboratory of Contract Archeology, Trinidad State Junior College, Trinidad Colorado. Also on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Haug, James D.
1968 Prehistoric eastern Colorado, 10,000 B.C. to 1 A.D. Southwestern Lore, vol. 34, no. 1, pp. 1-10.
- Henss, Ruth and Jane L. Anderson
1979 A cultural resource inventory of an access road in Gilpin County, Colorado. Pioneer Archaeological Consultants, Longmont. (Alternative D) (for Ron R. Hooson and J.E. Kurczodyna) Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Hester, James J.
1974 Archaeology in Colorado: 1974. Southwestern Lore, vol. 40, nos. 3-4, pp. 1-6.
- Hibbets, Barry N.
1976 Kenney Flats reforestation project: San Juan National Forest: Pagosa district. Archaeological survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1977 A-Block timber sale: San Juan National Forest: Pagosa district: archaeological survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Hibbets, Barry N. and William G. Reed
1977 Indian Creek timber sale: archaeological survey. Site reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Hillier, Laura E.
1979 Highlands Ranch: archaeological survey and test excavations of 3 sites. Highway salvage report no. 29 (for John D. Gooding). Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Hollenback, Jim F.
1979 Comanche National Grassland: Pike and San Isabel National Forests: range improvement projects. Archeological reconnaissance reports, USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Horner, Susan and Charles Horner
1974 Progress report for sites 5 JF 57 and 5 JF 60. Southwestern Lore, vol. 40, nos. 3-4, pp. 47-48.
- Hoyt, Steven D.
1979 Archaeological investigations of Torres Cave (5 LA 1310), Las Animas County, Colorado, 1977. Southwestern Lore, vol. 45, nos. 1-2, pp. 1-21.
- Hunt, Alice P.
1961 Artifacts associated with Pleistocene deposits in the Denver area, Colorado. Plains Archeological Conference News Letter, vol. III, reprint, pp. 43-44.
- Hunt, William J., Jr.
1979 Rawhide energy project. Stage II survey, subsurface testing, and analysis of Stage I and II data. Part 1, site reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Hurst, Blanche H.
1957 A comparative study of the peripheral excavations of C.T. Hurst. Southwestern Lore, vol. 23, no. 2, pp. 15-31.
- Hurst, C.T.
1939 A Ute shelter in Saguache County, Colorado. Southwestern Lore, vol. 5, pp. 57-64. Boulder.
- Hurst, C.T.
1946 Colorado's old-timers: the Indians back to 25,000 years ago. Southwestern Lore, vol. 7, pp. 18-26.
- Huscher, B.H. and H.A. Huscher
1941 Continuation of archaeological survey of southern and western Colorado. Year Book of the American Philosophical Society, 1941, pp. 226-229.
1942 Athapaskan migration via the intermontane region. American Antiquity, vol. 8, no. 1, pp. 80-88. 1943 The hogan builders of Colorado. Southwestern Lore, vol. 9, no. 2. Gunnison, Colorado.
- Husted, Wilfred
1965 Early occupation of the Colorado front range. American Antiquity, vol. 30, no. 4, pp. 494-498.
1970 Altithermal occupation of the northern Rocky Mountains by early plains hunting peoples. In: Abstracts for papers presented at the first meeting of the American Quaternary Association, p. 69. Bozeman, Montana.
1974 Prehistoric occupation of the alpine zone in the Rocky Mountains. In Arctic and alpine environments, edited by J.D. Ives and R.G. Barry. Methuen and Co., Ltd., London.
n.d. A rock alignment in the Colorado front range. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Hutchinson, Daniel J.
1972 Archaeology of the upper Arkansas river - Canon City to Buena Vista, Colorado. MS, Bureau of Land Management. Canon City, Colorado.
- Iannacito, E.
1976 Ptarmigan: a high-altitude site. Denver chapter, Colorado Archaeological Society, All Points Bulletin, vol. 13, no. 12, pp. 1-3.
- International Engineering Company, Inc.
1973 Environmental study, upper South Platte unit, Colorado. United States Department of the Interior, Bureau of Reclamation.
1973 Appendix to environmental study, upper South Platte unit, Colorado. United States Department of the Interior, Bureau of Reclamation.
- Ireland, Stephen K.
1968 Five Apishapa focus sites in the Arkansas valley, Colorado. MA Thesis. 107 pp.
1970 Purgatoire River reservoir salvage archeology, 1969: sites TC:C9: 4 and TC:C9:9. MS on file, National Park Service, Midwest Region, Lincoln, Nebraska.
1971 The upper Purgatoire complex -- a reappraisal. Southwestern Lore, vol. 37, no. 2, pp. 37-51.
1973-1974 Trinidad reservoir salvage archaeology. Trinidad State Junior College. National Park Service.

- 3 vols. reporting for 1970, 1971, 1972 projects. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1974 Archaeological survey of state highway 50 east of Canyon City. Salvage report no. 7. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1974 Trinidad reservoir salvage archeology, 1972. MS on file, National Park Service, Midwest Region, Lincoln, Nebraska.
- 1974 Trinidad reservoir salvage archeology, 1967. MS on file, National Park Service, Midwest Region, Lincoln, Nebraska.
- Ireland, Stephen K.
- 1974 Trinidad reservoir salvage archeology: 1963-1965. MS on file, National Park Service, Midwest Region, Lincoln, Nebraska.
- 1974 Trinidad reservoir salvage archeology, 1968. MS on file, National Park Service, Midwest Region, Lincoln, Nebraska.
- 1974 Trinidad reservoir: salvage work summary. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- n.d. The upper Purgatoire complex -- a re-appraisal. Report on file, National Park Service, Midwest Archaeological Center, Lincoln, Nebraska.
- Ireland, Stephen K. and Caryl E. Wood
- 1973 Trinidad reservoir salvage archeology: site TC:C9:20. MS on file with the National Park Service, Midwest Region, Lincoln.
- 1973 Trinidad reservoir salvage archeology, 1970, sites TC:C9:9B, TC:C9:23, TC:C9:24, TC:C9:302. MS on file, National Park Service, Midwest Region, Lincoln, Nebraska.
- Irwin, Cynthia and Henry Irwin
- 1958 Archaeology of the Agate Bluff area. *Plains Anthropologist* no. 7.
- Ives, R.L.
- 1942 Early human occupation of the Colorado headwaters region: an archaeological reconnaissance. *Geographical Review*, vol. 32, pp. 448-462.
- Jameson, D.A.
- 1969 General description of the Pawnee site. Technical report no. 1, grasslands biome, U.S. International Biological Program, natural resources ecology laboratory, Colorado State University.
- Jennings, Calvin H.
- 1973 The archaeological impact of four minor construction projects in Rocky Mountain National Park and Shadow Mountain National Recreation Area, Colorado. Report on file, National Park Service, Midwest Archaeological Center, Lincoln, Nebraska.
- 1977 Wolcott-Malta electrical transmission line: preliminary archaeological reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Jennings, Calvin H. and Elizabeth Ann Morris
- 1974 Fort Collins-Ault 230 KV transmission line: cultural resources survey. Colo. State Univ. for Tri-State Generation and Transmission, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Jennings, Calvin H. and Richard P. Taylor
- n.d. Green Mountain Inc. subdivision; preliminary archaeological reconnaissance report. Site reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Johnson, Ann M.
- 1977 Lebanon Mill/Mine complex: excavations, 1977. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Johnson, C. Ralph
- 1972 A study of north park tipis. *Southwestern Lore*, vol. 37, no. 4, pp. 93-101.
- Jones, Kevin T.
- 1977 Archaeological test excavations at the Blanca Wildlife Refuge in the San Luis Valley, Colorado. Reports of the Laboratory of Public Archaeology, no. 12. Fort Collins, Colorado.
- Karlson, Jamie A.
- 1980 Alamosa/Monte Vista National Wildlife Refuge expansion project: cultural resource survey. Negative report, U.S. Fish and Wildlife Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- King, Dale Stuart
- 1931 Archaeology of the central highlands of eastern Colorado. MA Thesis. 128 pp.
- Kingsbury, Lawrence A. and Michael Nowak
- 1980 Carrizo Ranches, Inc.; archaeological investigation reports: vol. 4 - 1974-1979. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Kivett, Marvin F.
1947 Preliminary appraisal of the archeological and paleontological resources of Cherry Creek reservoir, Arapahoe County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Kranzush, Kris J.
1978 Maitland Road: Roosevelt National Forest: cultural resource reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Kranzush, K., and M. Anderson
1975 Hideaway Park water system Vasquez Creek construction for Grand County water and sanitation district hideaway park water system. Cultural resource inventory report requested by U.S. Forest Service, Arapaho National Forest. On file at U.S.D.A. Forest Service, Fort Collins.
- Kranzush, K.J., E.K. Gordon and Michael Nowak
1975 Pankratz-Ramseyer access road: San Isabel National Forest. Cultural resource inventory report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Kranzush, Kris J. and E. Kinzie Gordon
1977 Sterling (city of) - "201" facilities plan: cultural resource inventory for Nelson, Haley, Patterson and Quirk, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1978 Sterling (city of) - "201" facilities plan - segment II: cultural resource inventory report for CE Maguire, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Kvamme, Kenneth L.
1978 Beaver Creek - Sterling 230 KV project: archaeological and historic resources of portions of Logan, Morgan and Washington counties. Reports of the Laboratory of Public Archaeology, no. 23. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1979 Settlement variability on the high plains of northeastern Colorado: the South Platte River. Southwestern Lore, vol. 45, no. 4, pp. 18-28.
- Kvamme, Kenneth L. and Elizabeth A. Morris
1978 Archaeological and historic resources of the Beaver Creek-Sterling 230 Kv project, portions of Logan, Morgan and Washington counties, Colorado. Public Service Company of Colorado, Denver.
- Lavine-Lischka, Leslie
1976 Black Canyon land exchange (proposed). Pike National Forest: archaeological reconnaissance and cultural resource survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lavine-Lischka, Leslie
1976 Johns Gulch timber sale: Pike National Forest (Manitou experimental forest): cultural resource survey. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lazio, Joseph
1976 Cultural resource inventory, Beaver Creek M.P.B. timber sale, Sulphur district. U.S.D.A. Forest Service, Arapaho National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Crown Point timber sale, Poudre district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Deadman Road timber sale, Red Feather district, U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Glacier View land exchange, Red Feather district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Kyle Gulch timber sale, Poudre district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Long Draw timber sale, Red Feather district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Mineral Springs timber sale, Poudre district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- Lazio, Joseph
1976 Cultural resource inventory, Mulstay timber sale, Sulphur district. U.S.D.A. Forest Service, Arapaho National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
1976 Cultural resource inventory, Pingree Park land exchange, Poudre district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.

- 1976 Cultural resource inventory, Upper Willow Creek timber sale, Sulphur district. U.S.D.A. Forest Service, Arapaho National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- 1976 Cultural resource survey, Lady Moon timber sale, Red Feather District, U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- 1978 Cultural resource inventory, Bronco Creek timber sale, Sulphur district. U.S.D.A. Forest Service, Arapaho National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- 1978 Cultural resource inventory, Bull Mountain timber sale, Red Feather district. U.S.D.A. Forest Service, Arapaho National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- 1978 Cultural resource inventory, Cottonwood timber sale, Sulphur district. U.S.D.A. Forest Service, Arapaho National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- 1978 Cultural resource inventory, Panhandle timber sale, Red Feather district. U.S.D.A. Forest Service, Roosevelt National Forest. MS on file at U.S.D.A. Forest Service, Fort Collins.
- Lennon, Thomas J., Michael S. Burney and Mark E. Sullivan
 - 1978 Maysville project area: road and drill construction sites: cultural resource inventory of the Rocky Mountain Precambrian project. Site reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lennon, Thomas J. and Mark E. Sullivan
 - 1978 Highlands Ranch: vol. 2 - Re-evaluation of mitigation recommendations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Leopold, Estella B. and Joe Ben Wheat
 - 1972 Palynology of the Olsen-Chubbuck site. Society for American Archaeology, Memoir 26, pp. 178-180.
- Lincoln, Thomas R.
 - 1978 Archeological reconnaissance. Rocky Mountain National Park. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1980 Twin Lakes test excavations. Water and power resources service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lippincott, Kerry A.
 - 1978 Uranium drill holes (proposed): cultural resource survey. Report on (79)? file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lischka, Joseph J.
 - 1977 Cotter Corporation uranium mill site. Cultural resource inventory and evaluation. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lischka, Joseph J.
 - 1978 Johnstown (city of): cultural resource inventory of 2 areas near Johnstown to be affected by proposed construction of sewage ponds. University of Colorado, for Ecology Consultants, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lischka, Joseph J. and Jane Anderson
 - 1976 Dike Mountain unit 1-10 drilling site and proposed access roads: cultural resource inventory report for Atlantic Richfield Co. Site reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1976 Tri-State Generation and Transmission Assn., Inc. Burlington gas turbine installation site: archaeological reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1978 Wray airport project-property addition: cultural resources inventory, for Harmon Engineering Services. Federal Aviation Administration. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lischka, Joseph J., Gary L. Moore, Nancy Wade and David McGuire
 - 1979 Stone and Webster Engineering Corporation: 3 proposed power plant sites in Bent and Otero counties. Cultural resources inventory and evaluation. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Longmont (City of)
 - 1977 Archaeological survey of Park North residential development, Longmont. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Louden, Willard C. and Stephen K. Ireland
 - 1974 Holly and Granada flood protection projects: archaeological site survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Lutz, Bruce
- 1974 Preliminary report on site 5 WL 48. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 42-45.
 - 1975 Denver Shoshone 115 kv transmission lines: Henderson phase 3 and the Keystone reroute. Archaeological survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1976 Bruff Creek timber sale: cultural resource inventory, San Isabel National Forest: Spanish Peaks district. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1976 Pawnee National Grasslands: archaeological reconnaissance. University of Northern Colorado, for Power Resources Corporation. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1976 Pole Creek timber sale: cultural resource inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1977 Drill hole sites (16). Archaeological survey for Power Resources, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1977 Meadows Industries property: Midway site: sewage treatment transmission and treatment plant. Cultural resource management survey. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lutz, Bruce J.
- 1977 Rawhide energy project: an archaeological-historical survey. Site reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1978 Cleverock Energy Corporation: Greenwood federal 7-14 proposed drill hole site. Archaeological survey report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1978 Wildcat Creek: test excavations of sites 5 MR 347 and 5 MR 360, for Riverside Irrigation District and Public Service Co. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1978 A literature review of cultural resources of 12 sections of land in Morgan County. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1978 Report of archaeological survey on the Pawnee National Grassland for Tri-State Generation and Transmission, Inc. Office of Public and Contract Archaeology, University of Northern Colorado, Greeley.
 - 1978 Wildcat Reservoir (proposed) for the Riverside Irrigation District and Public Service Co. of Colorado: cultural resource inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - n.d. Archaeological reconnaissance within the Pawnee National Grasslands, Weld County, Colorado. Office of Public and Contract Archaeology, University of Northern Colorado, Greeley.
- Lutz, Bruce J. and Cheryl L. Muceus
- 1978 South Platte River-Chatfield Dam to Denver: cultural resource reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lutz, Bruce and Brian O'Neil
- 1976 Archaeological sample design and reconnaissance within the Pawnee National Grasslands, Weld County, Colorado. Office of Public and Contract Archaeology, University of Northern Colorado, Greeley.
- Lutz, Bruce J., Gregory Williams and Roberta Nerison
- 1977 Greeley (city of): archaeological survey of proposed building site. University of Northern Colorado. General Service Administration. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Lyons, Ray D.
- 1976 Harriman Park subdivision, Lakehurst West, filing #3 and Stony Creek development lands: archaeological reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1977 Archaeological reconnaissance of open space lands: Means Meadow, Alderfer Ranch, Wyant - 3 Sisters tract. Prepared for Jefferson County Open Space. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 - 1979 Floral resources of the Torres Cave (5LA1310) vicinity. *Southwestern Lore*, vol. 45, nos. 1-2, pp. 43-47.

- Malde, Harold E.
1972 Geology of the Olsen-Chubbuck site. Society for American Archaeology, Memoir 26, pp. 171-177.
- Marquart, Cynthia
1968 Basic data on early sites in Colorado and adjacent regions. *Southwestern Lore*, vol. 34, no. 1, pp. 21-30.
- McCabe, Helen M.
1973 The settlement system of five prehistoric pueblo sites of the Upper Purgatoire Complex. *Southwestern Lore*, vol. 39, no. 3, pp. 12-29.
- McNamara, Anne P.
1978 Archaeological reconnaissance of the climax land exchange. Laboratory of Public Archaeology, Colorado State University.
1978 Uranium test hole locations: 6 proposed: archaeological reconnaissance. Prepared for American Nuclear Corp. and the Tenn. Valley Authority. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1979 Archaeological reconnaissance of the selected USFS lands, climax land exchange. Laboratory of Public Archaeology, Colorado State University.
1979 An archaeological reconnaissance of a pipeline alignment and three oil well locations, Jackson County, Colorado. Reports of the Laboratory of Public Archaeology, no. 31. Fort Collins, Colorado.
1979 Archaeological reconnaissance of three seismographic exploration lines in Jackson County, Colorado. Reports of the Laboratory of Public Archaeology, no. 30. Fort Collins, Colorado.
1979 Archaeological reconnaissance of one section in Jackson County, Colorado. Reports of the Laboratory of Public Archaeology, no. 32. Fort Collins, Colorado.
1980 Archaeological reconnaissance of two seismic delta exploration seismograph lines, Jackson County, Colorado. Reports of the Laboratory of Public Archaeology, no. 35. Fort Collins, Colorado.
- McNamara, Anne P. and Calvin H. Jennings
1978 Colorado Interstate Gas Company: proposed natural gas pipeline alignment in Weld and Adams counties, archaeological reconnaissance. Colorado State University (LOPA). 2 vol. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Marcotte, James, Daniel Mayo, and Elizabeth A. Morris
1978 Archaeological surveillance during construction activities at the Argentine Pass site, Summit County, Colorado. Reports of the Laboratory of Public Archaeology no. 19. Colorado State University.
- Martin, Curtis W.
1975 U.S. Highway 24 from Buena Vista to Granite: archaeological salvage. Inventory sheets. Highway salvage report #13.
1976 Archaeological survey of I-470, southwest circumferential. Highway salvage report 14. (for John D. Gooding) Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Maxey, Debra E.
1980 Public fuelwood areas 1-80 and 2-80: Pike and San Isabel National Forest. Cultural resource reports. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Mayo, Dan
1978 Four Mile Historic Park: preliminary report on excavations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Metcalf, Michael
1973 Archaeological excavations at Dipper Gap, northeastern Colorado. Unpublished Master's Thesis, Colorado State University, Fort Collins.
1974 Archaeological excavations at Dipper Gap: a stratified butte top site in northeastern Colorado. M.A. Thesis, Department of Anthropology, Colorado State University, Fort Collins.
1978 Anadarko 1 JMR Federal "A", archaeological survey report. Powers Elevation Co., Inc. Addendum, Feb., 1979, 2nd Addendum, Mar., 1979. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Metcalf, Michael D.
1979 Amoco seismic line QRF 1-6, archaeological survey. Powers Elevation Co., Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- 1979 Samson Oil Company Rawlins-Rutherford 1A20 well pad and access; archaeological survey report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Metcalf, Michael D., and Elizabeth Ann Morris
- 1973 Abstracts of Excavations at Dipper Gap: a McKean complex campsite, Logan Co., Colorado. Abstracts of Papers, p. 45. 38th Annual Meeting of the Society for American Archaeology, San Francisco.
- n.d. Archaeological survey in the Rawah Wilderness Area, northern Colorado. M.S. in possession of the author.
- Meydrech, Lee
- 1975 No Name timber sale: Pike and San Isabel National Forests, South Park District. Archeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Al Spring road: Pike and San Isabel National Forests: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Black Forest Recreation Site, proposed permit, Pike and San Isabel National Forests: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Colorado trail on the Salida district - 3 segments: Pike and San Isabel National Forests: Salida district: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Meydrech, Lee F.
- 1978 Drought related wildlife habitat improvement projects on the Comanche National Grassland: Pike and San Isabel National Forest: Comanche National Grassland. Archaeological vey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Electric power transmission line: range improvement: Pike and San Isabel National Forests: Comanche National Grassland district: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Foote land exchange: Pike and San Isabel National Forests: Salida district. Archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Lone Rock Reservoir (proposed): Pike and San Isabel National Forests: Comanche National Grassland district: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Range improvements (non-structural) - pitting, seeding and contouring. Pike and San Isabel National Forests: Comanche National Grassland: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Stockwater well in pasture 26: range improvement: Pike and San Isabel National Forest: Comanche National Grassland district: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Meydrech, Lee F.
- 1978 Underground water pipeline projects (# 167 through #172): range improvement: Pike and San Isabel National Forests: Comanche National Grassland Timpas district: archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1978 Water impoundment projects (# 161 through 166): range improvement: Pike and San Isabel National Forests: Comanche National Grasslands Timpas district. Archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1979 Chimney timber sale: Park and San Isabel National Forests, South Park district. Archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1979 Range fence project: (near Aspen Ridge, north of Salida): Pike and San Isabel National Forests. Archaeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Meyer, J. Steven
- 1978 Alamosa National Wildlife Refuge: proposed project 5 Chicago lateral ditch: Alamosa and Costilla counties. Cultural resources survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Meyers, Harry Christopher, Jr.
 1950 The archaeology of the San Luis valley. MA thesis. 102 pp.
 1950 Platoro reservoir site: preliminary appraisal of the archeological resources. River basin surveys, Smithsonian Institute. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Miller, Mark and Kathleen Wasson Fiero
 1977 Archaeological survey of the proposed Parker Road expansion between state highway 88 and Franktown. Highway salvage report 19. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Missouri Valley Project
 1947 Archaeological and paleontological resource of Cherry Creek reservoir. River basin surveys; Smithsonian Institution for Missouri River Basin Recreation Survey, region 11, National Park Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Moomaw, Jack C.
 1955 Rubbing stones found in northeastern Colorado. *Southwestern Lore*, vol. 21, no. 1, pt. 1, pp. 9-11.
 1957 Aborigines of the Colorado highlands. *Southwestern Lore*, vol. 23, no. 3, pp. 35-37.
 1960 The "Ring Makers". *Southwestern Lore*, vol. 25, no. 4, pp. 5-9.
- Morris, Elizabeth A.
 1974 Preliminary report on the archaeological survey of the Narrows project on the South Platte River, Morgan and Weld counties, Colorado. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 83-86. Boulder.
 1976 The Colorado mountains: an aboriginal refuge during periods of climatic fluctuation. Abstracts of the fourth biennial meeting of the American Quaternary Association, p. 154. Arizona State University. Tempe.
 1976 Abstract of Contribution to symposium on high country adaptations. 1976 Plains Conference, Minneapolis.
- Morris, Elizabeth A.
 1977 Abstract of "Prehistoric subsistence and settlement in northern Colorado." Contributed papers of the 43rd AAAS annual meeting, section H (Anthropology), Denver.
 1977 Abstract of "Preliminary report on the archaeology of the Lightning Hill site (5LR284), in the foothills of northern Colorado. Abstracts of papers, p. 60, 42nd annual meeting of the Society for American Archaeology, New Orleans.
 1978 Abstract of "Comments on five high-altitude Paleo-Indian sites in north-central Colorado." Abstracts of the fifth biennial meeting, p. 224, American Quaternary Association. Edmonton, Alberta.
 1978 Abstract of Prehistoric boulder structures in northeastern Colorado. Conference on megaliths to medicine wheels: boulder structures in archaeology. University of Calgary, Calgary, Alberta.
 1978 Archaeological survey of the proposed Briar Rose and Mine Shaft ski runs, Breckenridge, Colorado. Department of Anthropology, Colorado State University.
 1978 Archaeological reconnaissance of the proposed Rustic-Manhattan powerline. Report for the Poudre Valley Rural Electric Association, Department of Anthropology, Colorado State University.
 1979 Abstract of Archaeological research strategy and results in the South Platte River drainage, northeastern Colorado. International Congress of Americanists, p. 89. Vancouver.
 1980 Abstract of Lykins Valley: a historic Indian archaeological site in north-central Colorado. The Journal of the Colorado-Wyoming Academy of Sciences, vol. 12, no. 1, p. 10. Denver.
- Morris, Elizabeth A.
 In Prehistoric boulder structures in northeastern Colorado. Papers presented at the 1978
 Press Department of Archaeology Conference, University of Calgary.
 In Mountain-plains interaction patterns in the South Platte River drainage, northeastern Colo-
 Press rado. Papers presented at the 1979 Department of Archaeology Conference, University of
 Calgary.
- Morris, Elizabeth Ann, Jeffrey L. Eighmy and Daniel F. Mayo
 1979 Beaver Creek - Sterling 230 kV project: archaeological survey of 7 miles of the west end. Colorado State University, Public Service of Colorado. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Morris, Elizabeth Ann and Calvin H. Jennings
1974 An archaeological survey of the cultural resources of the Ft. Collins-Ault 230 Dv transmission line. Environmental impact statement of Tri-State Generation and Transmission Association, Inc. Denver.
- Morris, Elizabeth Ann and Ronald E. Kainer
1975 The Merino site (5LG122), a disturbed bison kill on the South Platte River, northeastern Colorado. *Southwestern Lore*, vol. 41, no. 1, pp. 1-14.
1978 Abstracts of Summary of northeastern Colorado prehistory. Program of 1978 Plains Conference, pp. 68-69. Denver.
- Morris, Elizabeth Ann and Kenneth L. Kvamme et al
1979 Archeology of the Boxelder project: a water control project, north-central Colorado, 1972-1979. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Morris, Elizabeth A., and Timothy J. Klobardanz
1975 Archaeological survey of the proposed Narrows unit project on the South Platte River, northeastern Colorado. Abstracts of the 88th Annual Research Conference, Colorado State University, p. 86. Fort Collins.
1976 Archaeological reconnaissance of the proposed Narrows Unit project on the South Platte River, northeastern Colorado. Abstracts of the Colorado-Wyoming Academy of Science, 47th Annual Meeting. P. 3, Boulder.
- Morris, Elizabeth Ann, Bruce J. Lutz, N. Ted Ohr, Timothy J. Klobardanz, Kenneth L. Kvamme, and Clark Pool
1975 Archaeological survey of the Narrows Unit project, Morgan and Weld counties, northeastern Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Morris, Elizabeth and James Marcotte
1975 Archaeological reconnaissance of the Cabin Creek-East Dillon line rebuild project, Clear Creek and Summit counties, Colorado. Laboratory of Public Archaeology, Colorado State University. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1976 Abstract of Preliminary report on the archaeology of the Lightning Hill site (5LR284) in the foothills of northern Colorado. 1976 Plains Conference, Minneapolis.
1976 Archaeological investigations in the Joe Wright Reservoir project, a high altitude locality in northern Colorado, cultural resources management report 7. Laboratory of Public Archaeology, Colorado State University. 32 pp.
- Morris, Elizabeth and James Marcotte
1977 Archaeological survey of the Dillon-Breckenridge segment of the proposed Dillon-Malta 230 kv electric transmission line, Summit County, Colorado. Report for the Colorado Public Service, Denver. Department of Anthropology, Colorado State University.
1977 Abstract of Excavations at the Lightning Hill site (5LR284) in the foothills of north-central Colorado. Program and Abstracts of the 35th Plains Conference, p. 23, Lincoln.
1977 Archaeological survey of the proposed solid waste disposal plant in the Red Feather Lakes area, Larimer County Engineer's Office. Department of Anthropology, Colorado State University.
- Morris, Elizabeth A., and Daniel R. Mayo
1978 Archaeological survey of the proposed North Star ski run, Breckenridge, Summit County, Colorado. Department of Anthropology, Colorado State University.
1979 Abstract of current research at the Lightning Hill site (5LR284), north-central Colorado. Society for American Archaeology, Vancouver.
- Morris, E.A. and Michael Metcalf
1972 Preliminary report on an archaeological reconnaissance of proposed reservoir areas in the Boxelder Creek watershed, Larimer County, Colorado. M.S. submitted to the U.S. National Park Service, Lincoln.
- Morris, Elizabeth A., Michael D. Metcalf, and Howard Davidson
1974 Final report on the 1972-1973 archaeological reconnaissance of proposed reservoir areas in the Boxelder Creek watershed, Larimer Co., Colorado. 60 pp. U.S. National Park Service Research Report, Lincoln. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Mosier, Ross E.
1979 Comanche Reservoir trail, Fish Creek access trail and parking lot: Roosevelt National Forest. Archeological reconnaissance report. Report on file, Office of the State Archaeologist,

Colorado Heritage Center, Denver.

- 1979 Pearl Creek timber sale: Arapaho-Roosevelt National Forests; Archeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1979 Wintersteen Park prescribed burn, Arapaho-Roosevelt National Forests; Archeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Mutel, Cornelia Fleischer

- 1976 From grassland to glacier, an ecology of Boulder County, Colorado. Land Grant Publishing Co., Boulder.

Nelson, Charles E.

- 1967 Prehistoric pottery trails of Colorado - II. Southwestern Lore, vol. 32, pp. 77-78.
- 1970 Chamber Cave. Southwestern Lore, vol. 36, no. 1, pp. 1-11. Reprint on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nelson, Charles E., Steven D. Emslie and Richard Van Horn

- 1980 Cherry Gulch site - 5JF63. Southwestern Lore (in press).

Nelson, Charles E. and Bruce G. Stewart

- 1973 Cherokee Mountain rock shelter. Plains Anthropologist, vol. 18, no. 62, pts. 1-2, pp. 328-335.

Nelson, Sarah M.

- 1979 Chatfield Reservoir project: archaeological investigations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1980 South Table Mountain, Golden, Colorado: historic and prehistoric resources survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nickens, Paul R.

- 1973 Blanca Wildlife Refuge - proposed construction site: archaeological reconnaissance. Bureau of Land Management. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nissley, Claudia

- 1977 Four Mile House: 1976 archaeological investigations. Final report. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nowak, Michael

- 1975 San Isabel National Forest - land transferal: cultural resource inventory report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1975 Trinchera watershed project: cultural resource inventory report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1977 Carrizo Ranches, Inc.: archaeological investigation reports: vol. 1 - 1974 excavations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nowak, Michael and Alison Ickes

- 1977 Carrizo Ranches, Inc.: archaeological investigation reports: vol. 2 - 1975 excavations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nowak, Michael and Jeff Indeck

- 1977 Carrizo Ranches, Inc.: archaeological investigation reports: vol. 3 - 1976 excavations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Nowak, Michael and Lawrence A. Kingsbury

- 1979 Carrizo Ranches, Inc.: archaeological investigation reports: vol. 5 - 1978 archaeological investigations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

Ohr, N. Ted, Bruce J. Lutz, Elizabeth A. Morris, Timothy J. Klobardanz, Kenneth L. Kvamme, and Clark Pool

- 1975 Archaeological survey of the Narrows Unit project, Morgan and Weld counties, northeastern Colorado. 315 pp. U.S. National Park Service Research Report. Lincoln.

Ohr, N. Ted, K. L. Kvamme, Michael D. Metcalf, Elizabeth A. Morris, Howard M. Davidson, Ronald E. Kainer, and Robert J. Burgess

- 1979 The archaeology of the Boxelder project: a water control project in Larimer County, north-central Colorado. Interagency Archeology Service, Denver.

Ohr, N. Ted, and Elizabeth Ann Morris

- 1980 Abstract of A historic Indian campsite in north-central Colorado. Program and Abstracts, 1980 meetings of the Society for American Archaeology, p. 80. Philadelphia.

Olson, Alan P., Arnold M. Withers and Steven Ireland

- 1968 Fryingpan-Arkansas project, 1966: archaeological salvage (Pueblo and Lake counties). Report

- on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Olson, A.P., R.O. Roland, and T.G. Bridge
1974 An archaeological assessment of Florissant Fossil Beds National Monument. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Olson, Byron
1967 Report of preliminary investigations on Rollins Pass. MS on file at U.S.D.A. Forest Service. Denver.
1967 Outline of proposed excavations on Rollins Pass. MS on file at U.S.D.A. Forest Service, Denver.
1968 Report of preliminary investigations and outline of proposed excavations. Rollins Pass: evaluation of proposal by the Institute of Arctic and Alpine Research, University of Colorado, Boulder, to conduct archaeological excavations. Multiple use survey prepared by John E. Burns. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Olson, Byron and James Benedict
1970 Fieldwork at the Rollins Pass sites, 1969. Report to the U.S. Forest Service and the Smithsonian Institution. On file at U.S.D.A. Ranger Station, Boulder.
- Parks and Recreation Dept.
1976 Four Mile House: archaeological and historical surveys. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Patterson, F.A.
1977 Erie water and sanitation district: cultural resource survey of selected portions. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Patterson, F.A., and Betsy L. Tipps
1978 A cultural resource survey of the Denver Federal Center. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1978 Denver Federal Center: cultural resource survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Potts, Bob, H.L. Potts, Mrs. Roberts of Hartsel, and Mr. Eyer of Fairplay
1934 South Park region: archaeological reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Price-McPherson, Penny J. and Howard M. Davidson
1979 Colorado Interstate Gas Co. (CIG): Flank storage field: preliminary report of cultural resources. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Raymond, Terri
1979 Golden Gate Canyon State Park: cultural resources inventory of 4 miles of the northern boundary. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Reed, Alan D.
1977 A culture history of Weld County, Colorado. (Paper for Professor Bruce Rippeteau). On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Reed, Alan D. and Steven G. Baker
1979 Homestake Mining Co.: uranium division: 6 prehistoric sites in Hale Gulch, in the pitch uranium project area, Gunnison National Forest. Archaeological evaluation. Centuries Research, Inc. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Renaud, E.B.
1930 Exploration archeologique du Colorado Oriental. *Journal de la Societe des Americanistes*, vol. XXIII, pp. 397-399. Paris.
1930 Les plus anciennes cultures prehistoriques du sud-ouest Americain. *L'Anthropologie*, vol. 40, no. 3, pp. 233-258. Paris.
1930 An unique Indian pictograph from southeastern Colorado. *El Palacio*, vol. XXX, pp. 175-179. Santa Fe.
1946 Archaeology of the Upper Rio Grande basin in southern Colorado and northern New Mexico. Archaeological series. Sixth paper, University of Denver. January, 1946. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska; Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Riches, Susan M.
1978 Florence, Colorado: cultural resource survey in the vicinity. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Rippeteau, Bruce, Marcia Tate, James Brechtel et al
1980 Tri-state Generation and Transmission Association: Big Sandy-Burlington 115 kv transmis-

- sion line (proposed route): cultural resource investigation. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Robinson, Christine K. and Bruce Benz
 1978 North Table Mountain: Western Paving Construction Co. lands. Cultural Resource Inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Sands, Anne W.
 1979 Crown Hill open space: cultural resources inventory for Jefferson County open space council. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Schaafsma, Curtis and John D. Gooding
 1974 Archaeological survey of state highway 50 from Salida to Coaldale. Highway salvage report #6. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1974 U.S. Highway 24 from Buena Vista to Granite: archaeological survey, salvage report #9. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Scott, Douglas D. and David A. Gillio
 1973 Foothills treatment plant area; tests at 2 archaeological sites. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Shafer, Judy Ann
 1978 Wolf Creek Pass East: vol. 1 - an archaeological survey. Site reports. Highway salvage report #26, Colorado Department of Highways. vol. 2 - cultural resource report for historical resources: US 160 from South Fork to Wolf Creek pass. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Shaw, Leslie
 1978 Pawnee National Grassland Survey. MS on file at the U.S.D.A. Forest Service, Fort Collins.
- Shields, Lane
 1980 Preliminary investigations at the McEndree Ranch site. Southwestern Lore, vol. 46, nos. 1 & 2. (in press)
- Sigstad, Steve
 1976 Pearl Lakes Trout Club land exchange: cultural resource inventory Rio Grande Nat. Forest. Site report. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Sigstad, John S.
 1979 An archeological resurvey of the proposed route of Cities Service Gas Company pipeline on the Pawnee National Grassland, Colorado. Report prepared for the Arapaho-Roosevelt National Forests, U.S.D.A. Forest Service. On file at U.S.D.A. Forest Service, Fort Collins. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1979 Cultural resource overview for the Arapaho-Roosevelt Forest Management Plan. U.S. Forest Service, Rocky Mountain region, Denver.
- Smith, Jack E.
 1972 Denver urban renewal area: proposal to Dept. of Housing and Urban Development for Archaeological Investigations of the Prehistory and History. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Stanford, Dennis
 1978 The archeology of the Dutton/Selby sites. Paper presented to the 1978 Plains Conference, Denver.
 1978 Dutton-Selby excavation and Lamb Springs excavation: grant proposal, Smithsonian Institute. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Stewart, Bruce
 1970 Park Point. Southwestern Lore, vol. 36, no. 2, pp. 21-23.
- Stransky, William E.
 1978 Rincon La Osa trail relocation: San Juan National Forest: Pine district: archaeological reconnaissance report summary. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Sullivan, Mark
 1974 Louisville, Colorado: preliminary archaeological reconnaissance and survey area. Boulder County Planning Commission. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1976 Fanny Canyon timber sale and Duckett timber sale. Archaeological survey. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1977 Cottonwood Pass timber sale: cultural resource inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Sullivan, Mark
1977 Cultural resource reconnaissance and inventory report, Colorado front range vegetative management pilot project. Archaeological survey and research group. MS on file at U.S.D.A. Forest Service, Fort Collins.
- Sullivan, Mark, Tom Lennon, and Mike Burney
1976 Williams Creek timber sale; Pike and San Isabel National Forest: Spanish Peaks district: archaeological (level IV) survey. University of Colorado, USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Tate, Marcia
1977 Prehistory of the Cache la Poudre River. Office of the State Archaeologist of Colorado, Colorado Historical Society.
1978 A synopsis of Colorado prehistory. Denver Chapter, Colorado Archaeological Society, All Points Bulletin, vol. 15, no. 6, pp. 2-11.
- Tate, Marcia
1979 Roxborough State Park: cultural resource inventory. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Tate, Marcia J., Lloyd J. Glasier, Robert P. Ryan, and David R. Stuart
1979 Twelve Mile House: archaeological investigation. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Taylor, Richard P.
1976 Archaeological reconnaissance of the Intermountain Rural Electric Association's proposed underground electrical transmission line. Laboratory of Public Archaeology, Colorado State University.
- Tipton, Richard B.
1967 A burial from the Chubbuck-Olsen site. Southwestern Lore, vol. 33, no. 1, pp. 14-21.
- Trujillo, John S.
1978 Big Springs shrub treatment: Rio Grande National Forest: Saguache dist. Cultural resource inventory report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1978 Kline Place aspen treatment, Rio Grande National Forest: Saguache Dist. Cultural Resource Inventory Report. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1978 Royal Gulch aspen treatment, Rio Grande National Forest: Saguache dist. Cultural Resource Inventory Report. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Trujillo, John S.
1978 South Carnero road outside ROW: (no. 675): Rio Grande National Forest: Saguache dist. Cultural Resource Inventory Report. USDA Forest Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1978 South Park Range improvement projects: Rio Grande National Forest: Saguache dist. Cultural Resource Inventory Report. 1. F1 Big Dry Drift Fence, 2. F2 Spring Gulch Drift Fence, 3. F3 South Park Drift Fence, 4. W2 Upper-Lower South Park Water Line. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
1979 Taylor Canyon 8 and 9, Rio Grande National Forest, Saguache dist.: Archeological Reconnaissance Report. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- U.S. Department of Agriculture
1974 Draft environmental statement for timber management plan for the Arapaho National Forest. U.S.D.A. Forest Service, Rocky Mountain region.
1976 Boulder-Grand Divide unit draft environmental statement. U.S.D.A. Forest Service, Rocky Mountain region.
1978 Draft environmental statement for Williams Fork land management. U.S.D.A. Forest Service, Rocky Mountain region.
1978 Colorado state supplement to U.S.D.A. Forest Service environmental statement. Roadless area review and evaluation II (RARE II). U.S.D.A. Forest Service-WO.
- Vest, Stephen R.
1980 Goose Creek timber sale, Pike National Forest: archeological reconnaissance report. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

- Watts, Howard
 1971 Archaeology of the Avery Ranch site on Turkey Creek, southeastern Colorado. Master's Thesis, Department of Anthropology, University of Denver. Denver, Colorado.
- Weber, David and C. Jan Anderson
 1977 Loveland Dam - pipeline and power plant site: archaeological reconnaissance. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Wedel, Waldo R.
 1939 Archeological reconnaissance in southeastern Colorado. Explorations and Field-work of the Smithsonian Institution in 1938, pp. 91-94.
 1964 Primitive man in the Boulder area. In Natural History of the Boulder Area edited by Hugo G. Rodeck, pp. 90-96. University of Colorado Museum leaflet no. 13, Boulder.
- Wheat, J.B.
 1971 The Olsen-Chubbuck site: a Paleoindian bison site in eastern Colorado. Society for American Archaeology, Memoir no. 34.
 1977 Technology, typology, and use patterns at the Jurgens site. In Paleoindian Lifeways, edited by Eileen Johnson, pp. 126-139. The Museum Journal 17. Lubbock: West Texas Museum Association.
- Wheeler, Charles W.
 1979 Wood Bros. Homes, Inc.: Archeological survey in eastern Jefferson County, by Charles W. Wheeler, Western Cultural Resource Management, Inc. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- White, Theodore E.
 1953 Appraisal of the paleontological resources of nine reservoirs in the Missouri River basin: supplement. A project of the Interagency Archaeological and Paleontological Program. Missouri Basin Project, Smithsonian Institute. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Windmiller, Ric and Frank W. Eddy
 1975 Two Forks archaeological project: archaeological study of aboriginal settlements and land use in the Colorado foothills. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
 1975 An archaeological study of aboriginal settlements and land use in Colorado foothills. Prepared for National Park Service contract no. CX-1595-4B-038.
- Withers, Arnold M. and Frank H.H. Roberts, Jr.
 1948 Blue River-South Platte project: preliminary survey of the archaeological resources. River Basin Surveys, Smithsonian Institute. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Withers, Arnold M.
 1949 Preliminary survey of the archeological resources in the Gunnison-Arkansas project, Colorado, east of the mountains. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1949 Preliminary survey of the archeological resources of the Blue River-South Platte project, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Withers, Arnold
 1950 Survey in eastern Colorado - University of Denver. Proceedings of the Sixth Plains Archeological Conference, 1948. Anthropological Papers no. 11, pp. 10-11.
- Withers, Arnold, and Thomas Huffman
 1956 Archaeological survey of the Pueblo Reservoir, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Vol. 1. Also on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Withers, Arnold M.
 1964 Archaeological survey of the Reudi Reservoir, Colorado. Unpublished report submitted by the University of Denver to the National Park Service, Midwest Region. Omaha.
 1964 An archaeological survey of Northwestern Pueblo County, Colorado. National Park Service. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1964 Archaeological survey of Northwestern Pueblo County and adjacent parts of El Paso and Fremont County to be appropriated for Ft. Carson. Report on file: National Park Service, Midwest Archeological Center, Lincoln, Nebraska; Office of the State Archaeologist, Colorado Heritage Center, Denver.

- 1965 Archaeological survey of the Sugarloaf, Twin Lakes, and Pueblo Reservoirs, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- 1968 Archaeological survey of the Chatfield Reservoir, Colorado. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Withers, Arnold
- 1972 Archaeological survey of the Chatfield Reservoir, Colorado, 1968. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wood, Caryl
- 1974 Excavations at Trinchera Cave, 1974. *Southwestern Lore*, vol. 40, nos. 3-4, pp. 53-56.
- Wood, W. Raymond
- 1972 Archeological interpretive report: Pueblo Reservoir, eastern Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Vol. 2. Also on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Wormington, H.M.
- 1948 Report of a survey conducted by the Denver Museum of Natural History in the Cherry Creek Reservoir area, Arapahoe County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Yelm, Mary
- 1935 Archaeological survey of Rocky Mountain National Park--eastern foothill districts. Master's thesis, University of Denver.
- Zalucha, L. Anthony
- 1976 Archeological survey, Dunes Picnic area, Great Sand Dunes National Monument. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.

KANSAS ARCHEOLOGICAL REPORTS

- Bass, William M., Dick McWilliams and Bruce A. Jones
- 1964 Archeological investigations at five sites in Lyon, Jefferson, and Phillips counties, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1966 Archeological investigations at five sites in Lyon, Jefferson, and Phillips counties, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln.
- Bliss, Wesley L.
- 1948 Preliminary appraisal of the archeological and paleontological resources of the proposed reservoirs in the Smoky Hill Sub-Basin Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Brown, Kenneth L.
- 1979 Late prehistoric settlement patterns in southwestern Kansas. *Plains Anthropologist*, vol. 24, no. 85, pp. 191-206.
- Brown, Lionel A.
- 1964 An appraisal of the archeological and paleontological resources of six reservoir areas in Kansas and Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Bussen, Jerome S.
- 1962 Some stone tipi rings in western Kansas. *Kansas Anthropological Association Newsletter*, vol. 8, no. 3.
- 1963 The Theis Bluff site: 14WC402. *Kansas Anthropological Association Newsletter*, vol. 8, no. 6.
- Calabrese, Francis A.
- 1967 A Keith focus woodland component at the Curry site, 14GR301. *Kansas Anthropological Association Newsletter*, vol. 12, no. 8.
- Coopridge, Kevin, and Brian O'Neill
- 1978 An archaeological survey of the proposed Sunflower electric power plant site near Holcomb, Kansas. Submitted to Sunflower Electric Cooperative, Inc.
- Cumming, Robert B., Jr.
- 1958 Archeological investigations at the Tuttle Creek dam, Kansas. *River Basin Surveys Papers*, no. 10, Bureau of American Ethnology, Bulletin 169. Washington.
- Elcock, David
- 1980 An archeological survey of the proposed power line from Holcomb, Kansas to Spearville,

- Elcock, David
 1980 An archeological survey of the proposed power line from Holcomb, Kansas to Spearville, Kansas. Submitted to Sunflower Electric Cooperative. Sponsored by the Finney County Historical Society. Prepared under the supervision of Dr. Patricia J. O'Brien, Kansas State University.
 1980 An archeological survey of the proposed power line from Mingo, Kansas to the Nebraska border. Submitted to Sunflower Electric Cooperative. Sponsored by the Finney County Historical Society. Prepared under the supervision of Dr. Patricia J. O'Brien, Kansas State University.
- Emerson, A.M.
 1976 Evidence for floodplain settlement in the Great Bend aspect of Marion, Kansas. Unpublished M.A. thesis, Department of Anthropology, Wichita State University.
- Feagins, Jim D.
 1976 J. Mett Shippee's personal field notes, Scott County, Kansas, 1939. Kansas Anthropological Association Newsletter, vol. 21, nos. 8-9, pp. 1-11.
- Graves, O.L.
 1963 Preliminary archeological survey of Barton County, Kansas. Kansas Anthropological Association Newsletter, vol. 8, no. 7.
- Graves, O.L. and Robert Button
 1965 Bissell point mound, Barton County, Kansas. Kansas Anthropological Association Newsletter, vol. 10, no. 5, pp. 1-n. p.
- Jones, Bruce A.
 1975 Puebloan pottery sherds from the major site, 14RC2. Kansas Anthropological Association Newsletter, vol. 21, no. 4.
 1976 Recent archeological investigations in Lake Scott State Park. Kansas Anthropological Association Newsletter, vol. 22, nos. 1-2, pp. 1-5.
- Jones, Bruce A. and Thomas A. Witty, Jr.
 1980 The Gilligan site. In: Salvage archeology of the John Redmond Lake, Kansas, edited by Thomas A. Witty, Jr. Kansas State Historical Society Anthropological Series, no. 8, pp. 67-125.
- Kelley, J.H.
 1966 Archaeological investigations in the Tuttle Creek Reservoir area. MS, Midwest Archeological Center, National Park Service. Lincoln.
- Kivett, Marvin F.
 1947 Preliminary appraisal of the archeological and paleontological resources of Cedar Bluff Reservoir, Trego County, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1947 Preliminary appraisal of the archeological and paleontological resources of Kirwin Reservoir, Phillips County, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Kivett, Marvin F.
 n.d. The Woodruff ossuary, a prehistoric burial site in Phillips County, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Lippincott, K.A.
 1976 Settlement ecology of Solomon River Upper Republican sites in north central Kansas. Unpublished Ph.D. dissertation, Department of Anthropology, University of Missouri.
- Manion, Norman R.
 1966 Cup-shaped object made from the right parietal of a human skull, A. Kansas Anthropological Association Newsletter, vol. 12, no. 1.
- Marshall, James O.
 1972 The archaeology of the Elk City Reservoir. Kansas State Historical Society Anthropological Series no. 6.
- Metcalf, John W.
 1975 The Trexler site and others along Coon Creek in Graham County, Kansas. Kansas Anthro-

- polological Association Newsletter, vol. 21, no. 3, pp. 1-11.
- Munsell, Marvin R.
 1961 Anthony: a Kansas-Oklahoma border site. *Plains Anthropologist*, vol. 6, no. 12, pt. 2, pp. 112-114. Norman.
- Neuman, Robert W.
 1963 Archeological salvage investigations in the Lovewell Reservoir area, Kansas. River Basin surveys papers, no. 32. Smithsonian Institution, Bureau of American Ethnology, bulletin 185, pp. 258-306.
- Reichart, Milton
 1975 Timber Canyon. *Kansas Anthropological Association Newsletter*, vol. 21, nos. 1-2.
- Reynolds, John D.
 1977 Preliminary report of archeological investigations at site 14ML307, the range mound, Glen Elder, Kansas. *Kansas Anthropological Association Newsletter*, vol. 23, nos. 2-3, pp. 1-11.
- Richards, Dorothy
 1956 Petroglyphs of Kansas and Colorado. *Kansas Anthropological Association Newsletter*, vol. 1, no. 9.
- Rohn, Arthur H., and Cherie A. Rohn
 1973 Inventory of recorded archaeological sites in the proposed Weld Seward pipeline area, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Rohn, Arthur H., and Barry G. Williams
 1974 Assessment of possible archaeological resources in the proposed Kinsley local protection project area, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Rucker, Marc D.
 1971 Additional puebloan sherd dates from Kansas. *Kansas Anthropological Association Newsletter*, vol. 17, no. 4.
- Schmits, Larry J.
 1980 The Williamson, Salb and Dead Hickory sites. In *Salvage Archeology of the John Redmond Lake, Kansas*, edited by Thomas A. Witty, Jr. *Kansas State Historical Society Anthropological Series*, no. 8, pp. 13-66, 126-132, 133-162.
- Schultz, Ray S.
 1969 Allison's Ranch. *Kansas Anthropological Association Newsletter*, vol. 15, no. 4, pp. 1-8.
- Shock, Jack M.
 1965 Hunting camp in Logan County, Kansas, 14LO8, A. *Kansas Anthropological Association Newsletter*, vol. 10, nos. 7-9.
- Smith, Carlyle S.
 1950 Climate and archaeology in Kansas. *Proceedings of the Sixth Plains Archeological Conference (1948)*. *Anthropological Papers* no. 11, pp. 98-99. Dept. of Anthropology, University of Utah.
 1961 Fieldwork in Kansas, 1949. In: *Plains Archeological Conference Newsletter*, vol. 2 (reprint), 1948-1949, pp. 38-40.
- Smith, H.T.U.
 1938 Geomorphic evidence relating to the antiquity of man in north-central Kansas. *Abstract of the Geological Society of America Bulletin*, vol. 49, p. 1901.
- Solecki, Ralph
 1952 Appraisal of the archeological resources of the Webster Reservoir, Rooks County, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1952 Appraisal of the archeological resources of the Glen Elder Reservoir, Mitchell and Osborne counties, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1952 Appraisal of the archeological resources of the Kirwin Reservoir, Phillips County, Kansas, Supplement. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Sperry, James E.
 1965 Cultural relationships of the Miller and Rush Creek archaeological sites on the Lower

- Republican River of Kansas. Unpublished M.A. thesis, Department of Anthropology, University of Nebraska, Lincoln.
- Terry, Kenneth, and Ina Terry
1961 Chain mail and other exotic materials from south-central Kansas. *Plains Anthropologist*, vol. 6, no. 12, pt. 2, pp. 126-129.
- Vehik, Susan
1976 The Great Bend aspect: a multivariate investigation of its origins and southern plains relationship. *Plains Anthropologist*, vol. 21, no. 73, pt. 1, pp. 199-206.
- Wedel, Waldo R.
1934 Salina 1: a protohistoric village site in McPherson County, Kansas. *Nebraska History Magazine*, vol. 15, no. 3, pp. 251-255.
- Williston, S.W.
1905 On the occurrence of an arrowhead with bones of an extinct bison. *Transaction of the 13th Session International Congress of Americanists*, pp. 335-337.
- Wilmsen, Edwin N.
1974 *Lindenmeier: a Pleistocene hunting society*. New York: Harper and Row.
- Witty, Thomas A., Jr.
1961 Newly designated sites: 14 BT 404. *Kansas Anthropological Association Newsletter*, vol. 7, no. 2.
1961 Newly designated sites: 14GL401. *Kansas Anthropological Association Newsletter*, vol. 7, no. 1.
1962 Newly designated sites: 14RU401. *Kansas Anthropological Association Newsletter*, vol. 7, no. 5.
1962 Preliminary report on the Morris site, 14MO314. *Kansas Anthropological Association Newsletter*, vol. 7, no. 5.
1963 The Woods, Avery and Streeter archaeological sites, Milford Reservoir, Kansas. *Kansas State Historical Society Anthropological Series* no. 2. Topeka.
- Witty, Thomas A., Jr.
1964 The West Island site, 14PH10, a Keith focus plains woodland site in Kirwin Reservoir, Phillips County, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1966 Larned field school. *Kansas Anthropological Association Newsletter*, vol. 11, no. 8, pp. 7-8.
1969 The Allison Ranch dig. *Kansas Anthropological Association Newsletter*, vol. 14, no. 9, pp. 1-3.
1970 K.A.A. fall dig 1970. *Kansas Anthropological Association Newsletter*, vol. 16, no. 3, pp. 1-3.
1974 K.A.A. dig, 1973; the Minneapolis site, one more time. *Kansas Anthropological Association Newsletter*, vol. 19, no. 5, pp. 1-4.
1978 The Penokee Stone Indian. *Kansas Anthropological Association Newsletter*, vol. 23, no. 6, pp. 6-9.
1980 Salvage archeology of the John Redmond Lake, Kansas. *Kansas State Historical Society Anthropological Series*, no. 8.
- Yaple, Dennis D.
1968 Preliminary research on the Paleoindian occupation of Kansas. *Kansas Anthropological Association Newsletter*, vol. 13, no. 7, pp. 1-9.

NEBRASKA ARCHEOLOGICAL REPORTS

- Agenbroad, Larry D.
1978 The Hudson-Meng site: an Alberta bison kill in the Nebraska high plains. *Plains Anthropologist*, vol. 23, no. 82, pt. 2, pp. 128-131.
- Bauxar, J.J., W.L. Bliss, and T.E. White
1948 Preliminary appraisal of the archeological and paleontological resources of certain proposed reservoirs in the Republican River sub-basin. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Bleed, Peter
1973 A report on 1973 archaeological investigations in the Wood River valley, Buffalo County, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1978 Supplemental data subsurface testing program midstate irrigation project. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Brodnicki, Edward Casimir
1979 Archeological reconnaissance within a proposed flood control project; city of Ravenna, Buffalo County, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Carlson, Gayle F., and Richard E. Jensen
1973 Archeological salvage and survey in Nebraska. *Nebraska State Historical Society Publications in Anthropology*, no. 5. Lincoln.
- Champe, John L.
1950 Archeological investigations in the Harlan County Reservoir. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Cumming, Robert B., Jr.
1953 Appraisal of the archeological and paleontological resources of the lower Platte basin, Nebraska: supplement. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Davis, E. Mott
1951 Investigations by the University of Nebraska State Museum in the Medicine Creek Reservoir area in 1950. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1952 Archeological investigations in 1951 in the Medicine Creek Reservoir area by the University of Nebraska State Museum. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1954 Final salvage work at the Red Smoke site, excavations by the University of Nebraska State Museum in the Medicine Creek Reservoir area in 1953. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Davis, E. Mott and C. Bertrand Schultz
1950 Progress report of archeological investigations in the Medicine Creek Reservoir area by the University of Nebraska State Museum in the autumn of 1950. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1952 The archaeological and paleontological salvage program at the Medicine Creek Reservoir, Frontier County, Nebraska. *Science*, vol. 115, no. 2985, pp. 288-290.
- Figgins, J.D.
1931 An additional discovery of the association of a Folsom artifact and fossil mammal remains. *Proceedings of the Colorado Museum of Natural History*, vol. X, no. 4, pp. 23-24.
- Garrett, John W.
1965 The Birdwood culture of the west-central Plains. *American Antiquity*, vol. 31, no. 1, pp. 74-80.
- Grange, Roger T., Jr.
1962 Preliminary report, excavations in the Red Willow Reservoir, Nebraska, 1961. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1979 An archeological view of Pawnee origins. *Nebraska History*, vol. 60, no. 2, pp. 134-160.
1979 Salvage archaeology in the Red Willow Reservoir. MS submitted to the Nebraska State Historical Society, Lincoln.
- Gunnerson, James H., and Dolores A. Gunnerson
1949 Further notes on the Dismal River aspect. MS presented at Seventh Plains Archeological Conference, Lincoln, Nebraska. November.

- 1952 Appraisal of the archeological and paleontological resources of the Lower Platte Basin, Nebraska, supplement. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Henning, Dale R.
1978 Archaeological investigations in the proposed midstate irrigation project. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Hill, A.T.
1934 Archeology explorations in Nebraska in 1933. Nebraska History Magazine, vol. 14, no. 3, pp. 174-177.
1939 The archeological exploration of 1938. Nebraska History, vol. 20, no. 2, pp. 91-151.
- King, N. Steven
1976? The Lapp site - 25 FT 139. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Kivett, Marvin F.
1947 Preliminary appraisal of the archeological and paleontological resources of Enders Reservoir, Chase County, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1947 Preliminary appraisal of the archeological and paleontological resources of the Harlan County Reservoir, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1947 Preliminary appraisal of the archeological and paleontological resources of Medicine Creek Reservoir, Frontier County, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1951 Archeological investigations, Swanson Lake project, Hitchcock County, southwestern Nebraska in 1950. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1962 Logan Creek complex. 20th Plains Archeological Conference.
n.d. The Harlan County Reservoir technological report (1st draft). Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Kivett, Marvin F. and A.T. Hill
1949 Archeological investigations along Medicine Creek. Proceedings of the Fifth Plains Conference for Archeology. University of Nebraska, Laboratory of Anthropology, Note Book no. 1, pp. 25-26.
- Kivett, M.F. and Preston Holder
1949? Report of paleontological and archaeological investigations during 1948 by the University of Nebraska State Museum in the reservoir areas of Republican River drainage. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Kivett, Marvin F. and J.T. Hughes
1947 Preliminary appraisal of the archeological and paleontological resources of certain proposed reservoir areas in the Lower Platte sub-basin Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Lewis, Rhoda Owen
1978 Use of opal phytoliths in paleo-environmental reconstruction at the Hudson-Meng site: an Alberta bison kill in the Nebraska high plains, by Larry D. Agenbroad, Appendix III, pp. 211-215. Washington: University Press of America.
- Ludwickson, John
1978 Artifact descriptions, midstate survey. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Mundell, Raymond L.
1974 Vertebrate faunal materials from archeological investigations, Red Willow Reservoir, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Renaud, E.B.
1934 Archaeological survey of western Nebraska. University of Denver. Department of Anthropology. May. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Schultz, C. Bertrand and L.C. Eiseley
1936 An added note on the Scottsbluff. American Anthropologist, vol. 38, no. 3, pp. 521-524.

- Schultz, C. Bertrand and W.D. Frankforter
 1949 The Lime Creek sites. Proceedings of the Fifth Plains Conference for Archeology. University of Nebraska, Laboratory of Anthropology, Note Book no. 1, pp. 132-134.
- Toohy, Loren
 1948 Report of paleontological and archaeological investigations during 1948 by the University of Nebraska State Museum in the reservoir areas of Republican River drainage. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Toom, Dennis
 1978 An assessment of cultural resources in the impact areas of dams 1, 2, 3 of the proposed Wauneta flood control project, Chase County, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- University of Nebraska State Museum
 1949 Annual report of field work in federal reservoir areas in the Republican River drainage in Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1950 Medicine Creek Reservoir area, Frontier County, Nebraska (Republican River). Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wedel, Waldo R.
 n.d. Prehistoric farmers and hunters of Medicine Creek. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wedel, Waldo R.
 1933 Preliminary notes on the archaeology of Medicine Valley in south-western Nebraska. Nebraska History Magazine, vol. 14, no. 3, pp. 145-166.
- Wu, Shi-kuei and Charles A. Jones
 1978 Molluscs from the Hudson-Meng site. In The Hudson-Meng site: an Alberta bison kill in the Nebraska high plains by Larry D. Agenbroad, Appendix II, pp. 193-210. Washington: University Press of America.

NEW MEXICO ARCHEOLOGICAL REPORTS

- Agogino, George A. and James Hester
 1953 The Santa Ana pre-ceramic sites. El Palacio, vol. 60, no. 4, pp. 131-140.
- Agogino, George A.
 1968 Archaeological excavations at Blackwater Draw locality no. 1, New Mexico 1963-1964. National Geographic Society Research Reports on 1963 Projects: 1-7.
- Agogino, George A., David K. Patterson, and Deborah E. Patterson
 1976 Blackwater Draw locality no. 1, south bank: report for the summer of 1974. Plains Anthropologist, vol. 21, no. 73, pt. 1, pp. 213-223.
- Alpers, Frank H.
 1963 Surface surveys of prehistoric Ponil River sites. El Palacio, vol. 70, no. 4, pp. 35-43.
- Berman, Mary Jane
 1979 Cultural resources overview of Socorro, New Mexico. Report for Cibola National Forest, Gila National Forest, Socorro District Bureau of Land Management. USDA Forest Service.
- Blakeslee, Donald J.
 1978 Assessing the central plains tradition in eastern Nebraska: content and outcome. Pp. 134-143 in The Central Plains Tradition: Internal Development and External Relationships, edited by Donald J. Blakeslee. Report no. 11, Office of the State Archaeologist, Iowa City.
- Blakeslee, Donald J. and Warren W. Caldwell
 1979 The Nebraska phase: an appraisal. Reprints in Anthropology, vol. 18.
- Bryan, K.
 1937 Geology of Folsom deposits in New Mexico and Colorado. Pan American Geologist, vol. 67, pp. 373-374.
- Buge, D.E.
 1971 Pollen analysis of the Folsom type locality: preliminary report. Palynology Laboratory, Department of Anthropology, Arizona State University, Tempe. MS.

- Bullard, William Rotch, Jr.
 1962 The Cerro Colorado site and pithouse architecture in the southwestern United States prior to A. D. 900. *Papers of the Peabody Museum of Archaeology and Ethnology*, Harvard University XLIV (2). Cambridge.
- Dawson, Jerry and James Judge
 1969 Paleo Indian sites and topography in the middle Rio Grande valley of New Mexico. *Plains Anthropologist*, vol. 14, no. 44, pp. 149-163.
- Dick, Herbert W.
 1953 River basin survey papers, no. 5, the Hodges site, 1. Two rock shelters near Tucumcari, New Mexico. In *Bulletin of the Bureau of American Ethnology*, no. 154, pp. 271-284. Washington.
- Ellis, Florence Hawley
 1964 Archaeological history of Nambe Pueblo, 14th century to the present. *American Antiquity*, vol. 30, no. 1, pp. 34-42.
- Ellis, Florence Hawley and J.J. Brody
 1964 Ceramic stratigraphy and tribal history at Taos Pueblo. *American Antiquity*, vol. 29, no. 3, pp. 316-327.
- Hammack, L.C.
 1966 The Tunnard site. *Museum of New Mexico Research Records*, no. 3. Santa Fe.
- Haynes, C. Vance, Jr. and George Agogino
 1966 Prehistoric springs and geochronology of the Clovis site, New Mexico. *American Antiquity*, vol. 31, no. 6, pp. 812-821.
- Holden, W.C.
 1932 Excavations at Tecolote during the summer of 1931. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 4, pp. 25-28.
- Jeancon, J.A.
 1929 Archeological investigations in the Taos valley, New Mexico, during 1920. *Smithsonian Miscellaneous Collection*, vol. 81, no. 12.
- Jelinek, Arthur
 1960 An archaeological survey of the Middle Pecos River and the adjacent Llano Estacado. Doctoral dissertation, University of Michigan, Ann Arbor.
- Judge, W. James
 1973 The PaleoIndian occupation of the central Rio Grande valley, New Mexico. Albuquerque: University of New Mexico Press.
- Judson, Sheldon
 1953 Geology of the Hodges site, Quay County, New Mexico. *Bulletin of the Bureau of American Ethnology* 154, River Basin Survey Paper no. 5, part II, pp. 285-302.
- Kidder, Alfred V.
 1916 The Pueblo of Pecos. *Archaeological Institute of America, Papers of the School of American Research*, no. 33, Santa Fe.
 1917 The old north pueblo of Pecos, the condition of the main Pecos ruin. *Archaeological Institute of America, Papers of the School of American Research*, no. 38, Santa Fe.
 1924 An introduction to the study of southwestern archaeology, with a preliminary account of the excavations at Pecos. *Papers of the Phillips Academy Southwestern Expedition*, no. 1. New Haven.
 1925 Pecos explorations in 1924. *Archaeological Institute of America, Papers of the School of American Research*, new ser. no. 11. Santa Fe.
 1926 Early Pecos ruins in the Forked Lightning Ranch. *Archaeological Institute of America, Papers of the School of American Research*, new ser. no. 16. Santa Fe.
 1926 The excavations at Pecos in 1925. *Archaeological Institute of America, Papers of the School of American Research*, new ser. no. 14. Santa Fe.
 1958 Pecos, New Mexico: archaeological notes. *Papers of Robert S. Peabody Foundation for Archaeology*, no. 5. Andover.
- Kirkpatrick, David T.
 1976 Archaeological investigations in the Cimarron district, northeastern New Mexico: 1929-1975. *AWANYU*, vol. 4, no. 3, pp. 6-15.
 1976 The prehistory of northeastern New Mexico. *New Mexico Geological Society 27th Field Conference*, Vermejo Park. Rodney C. Ewing and Barry S. Kues, eds., pp. 77-82.
 1977 Preliminary archaeological survey of Ponil Park, New Mexico. MS submitted to Mr. Robert U. Haslanger, Vermejo Park, Raton, new Mexico.

- Levine, Frances and Charles M. Mobley
 1976 Archeological resources at Los Esteros Lake, New Mexico. Department of Anthropology, Institute for the Study of Earth and Man, Southern Methodist University. Dallas.
- Luebben, Ralph A.
 1968 Site TA 32: a deep pit house and surface manifestation in north-central New Mexico. In: Harold and Luebben, Papers on Taos Archaeology. Fort Burgwin Research Center Report no. 7.
- Lutes, Eugene
 1959 A marginal prehistoric culture of northeastern New Mexico. *El Palacio*, vol. 66, no. 2, pp. 59-68. Santa Fe.
- Mera, H.P.
 1938 Some aspects of the Largo cultural phase, northern New Mexico. *American Antiquity*, vol. 3, no. 3, pp. 236-243.
 1940 Population changes in the Rio Grande glaze paint area. Laboratory of Anthropology Technical Series 9. Santa Fe.
 1944 Jaritas rock shelter, northeastern New Mexico. *American Antiquity*, vol. 9, no. 3, pp. 294-301.
- Morris, E.A.
 1970 High altitude archeological sites in Arizona and New Mexico. In: Abstracts for Papers Presented at the First Meeting of the American Quaternary Association, p. 96. Bozeman, Montana.
- Murphy, Lawrence R.
 1972 Philmont, a history of New Mexico's Cimarron country. Albuquerque: University of New Mexico Press.
- Oakes, Yvonne Royce, and Timothy D. Maxwell
 1980 The Overlook site: an archeological clearance survey near Las Vegas, New Mexico. Laboratory of Anthropology Note no. 170. Santa Fe.
- Peckham, S.L. and E.K. Reed
 1963 Three sites near Ranchos de Taos, New Mexico. Highway Salvage Archaeology, vol. 4, Museum of New Mexico and the New Mexico State Highway Department, Santa Fe.
- Price, W. Armstrong
 1944 The Clovis site: regional physiography and geology. *American Antiquity*, vol. 9, no. 4, pp. 401-407.
- Renaud, E.B.
 1937 Northeastern New Mexico. University of Denver, Department of Anthropology, The Archeological Survey of the High Western Plains, 9th Rep. Denver.
 1937 The archaeological survey of the high western plains. Ninth report. Northeastern New Mexico. University of Denver. Department of Anthropology. February.
 1938 Archaeological survey series, eleventh report, Petroglyphs of north-central New Mexico. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1938 The snake among the petroglyphs from northcentral New Mexico. *South-western Lore*, vol. 4, no. 3. December.
 1939 Petroglyphs of northcentral New Mexico. Archaeological Survey Series. Eleventh report. University of Denver, Denver, Colo. November 1938, February 1939.
- Skinner, S. Alan
 1964 Lizard cave: a rock shelter in northeastern New Mexico. *El Palacio*, vol. 71, no. 3, pp. 22-29.
 1965 Lizard cave: a rock shelter in northeastern New Mexico. *El Palacio*, vol. 72, no. 1, pp. 5-24.
- Steen, Charlie R.
 1955 The Pigeon Cliffs site: a preliminary report. In: *El Palacio*, vol. 62, nos. 5 and 6, Santa Fe.
- Thoms, Alston
 1976 Review of northeastern New Mexico archaeology. *Awanyu*, vol. 4, pp. 8-36.
- Tierney, G.D.
 1972 Some notes and observations on the Sitio Creston site (LA 4939). Museum of New Mexico, Laboratory of Anthropology notes no. 62, Santa Fe.
- Wendorf, Fred, and James J. Hester, editors
 1975 Late Pleistocene environments of the southern high plains, Fort Burgwin Research Center Publication 9, Ranchos de Taos, NM.

OKLAHOMA ARCHEOLOGICAL REPORTS

Ahshapanek, Don C. and Robert D. Burns

- 1960 Mammals associated with prehistoric people of Oklahoma. Oklahoma Academy of Science Proceedings, vol. 40, pp. 16-19. Weatherford.

Anon

- 1968 Basketmaker mummy unearthed near Kenton. Boise City News Historical Edition, page 10, section D.
1976 Age of Mankind. First Annual Old Timers News Year Book, Keyes, Oklahoma, pp. 11-13.
1976 Prehistoric man on the high plains. First Annual Old Timers Year Book, Keyes, Oklahoma, pp. 60-61.

Baker, William E. and A.V. Kidder

- 1937 A spear thrower from Oklahoma. American Antiquity, vol. 3, no. 1, pp. 51-52. Menasha.

Bareis, Charles John

- 1959 Ecology and subsistence in prehistoric eastern Oklahoma. Oklahoma Anthropological Society Newsletter, vol. 8, no. 3, pp. 8-9. Norman.

Barr, Thomas P.

- 1966 Archaeological survey of the upper Elk Creek watershed, Washita, Beckham, and Kiowa counties, Oklahoma. Oklahoma River Basin Survey Project, General Survey Report no. 7, pp. 86-108. Norman.

Bell, Robert E.

- 1953 Basket-maker cave of Cimarron County, Oklahoma. Oklahoma Anthropological Society Newsletter, vol. 2, no. 1, pp. 3-4. Norman.

Benton, Jennie Rose

- 1968 County Indian relics predate Christian era. Boise City News Historical Edition, p. 2, Section D.

Burchardt, Bill

- 1958 Black Mesa. Oklahoma Today Magazine, vol. 9, no. 1, pp. 2, 28-29. 1975 Ancient irrigation. Oklahoma Today Magazine, vol. 26, no. 1.

Campbell, Robert G.

- 1973 An archaeological survey of the Dry Cimarron, northeast New Mexico and western Oklahoma. Abstracts of Papers, Archaeological Society of New Mexico, Annual Meeting, April, 1973, Santa Fe.

Cutler, Hugh

- 1959 Plant materials from six Oklahoma sites. Oklahoma Anthropological Society Newsletter, vol. 8, no. 3, pp. 4-7. Norman.

Dale, Vincent

- n.d. The McGrath site. MS on file at Stovall Museum, Norman, Oklahoma, 7 pp.
n.d. Tx-20, Texas County, Oklahoma. MS on file at Stovall Museum, Norman, Oklahoma, 16 pp.
1973 A unique vessel from the Oklahoma panhandle. Bulletin of the Oklahoma Anthropological Society, vol. 21, pp. 187-190.

- 1976 A belated report on corner tanged knives from Texas County. Oklahoma Anthropological Society Newsletter, vol. 25, no. 7, pp. 8-10.
- 1977 The Boatstone site (Tx-60) in Texas County, Oklahoma. Bulletin of the Oklahoma Anthropological Society, vol. 26, pp. 99-103.
- Dick, Herbert W.
1965 Salvage operations at Picuris Pueblo, N.M. MS on file, National Park Service, Southwest Region, Santa Fe.
- Duffield, L., and E.E. Pillaert
1967 Modern bison appeared on the southern plains 750 AD. Oklahoma Anthropological Society Newsletter, vol. 15, p. 1.
- Duncan, Kelley C. and Mary Lou Frickle
1979 An archaeological assessment of the cultural resources of the Englewood Lake project area. Archaeological Research Associates, Research Report 20, Tulsa.
- Evans, O.F.
1957 Related problems of archaeology and geology. Bulletin of the Oklahoma Anthropological Society, vol. 5, pp. 21-22. Oklahoma City.
- Gettys, J. Marshall
1976 Paleo-Indian and early Archaic occupations in Oklahoma. Papers in Anthropology, vol. 17, no. 1, pp. 51-74. Norman.
- Gilbert, Claudette Marie
1980 Prehistoric Oklahomans. University of Oklahoma, Stovall Museum and the Oklahoma Archaeological Survey.
- Hay, O.P. and H.J. Cook
1930 Fossil vertebrates collected near or in association with human artifacts at localities near Colorado, Texas; Frederick, Oklahoma; and Folsom, New Mexico. Proceedings of the Colorado Museum of Natural History, vol. 9, no. 2, pp. 4-40. Denver.
- Holmes, Mary Ann
1972 The Black Mesa survey. Oklahoma Anthropological Society Newsletter, vol. 20, no. 9, p. 2.
- Johnson, Leonard
1950 Preliminary appraisal of the archaeological resources of the Optima Reservoir. Manuscript on file at Dept. of Anthropology, Oklahoma University and at Archaeological Research and Management Center, Norman.
- Katchell, Harold S.
n.d. Prehistory and history (of the Optima Lake area). MS on file at the Oklahoma Archaeological Survey, Norman, 9 pp.
- Kay County Chapter
1963 The Fred Loomis site, a small group burial near Freedom, Oklahoma. Bulletin of the Oklahoma Anthropological Society, vol. 11, pp. 123-132.
- Lawton, Sherman P.
1962 Petroglyphs and pictographs in Oklahoma: an introduction. Plains Anthropologist, vol. 7, no. 17, pp. 189-193. Lincoln.
1966 Progress report upon radiocarbon dates from Duncan Wilson shelter. Oklahoma Anthropological Society Newsletter, vol. 14, no. 8.
1966 Pueblo influences in Oklahoma. Bulletin of the Oklahoma Anthropological Society, vol. 14, pp. 93-104.
- Lees, William B.
1977 Investigations at Tx-33, Old Hardesty, Texas County, Oklahoma. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Lintz, Christopher
n.d. Antelope Creek focus. In (Robert E. Bell, ed.) Prehistory of Oklahoma. MS.
1972 The 1972 O. U. field school. Oklahoma Anthropological Society Newsletter, vol. 20, no. 6, pp. 8-9.
1973 A possible chipped axe from the Texas panhandle. Oklahoma Anthropological Society Newsletter, vol. 21, no. 7, pp. 2-5.
1973 A preliminary report of the Two Sisters site, a panhandle aspect site from Oklahoma. Manuscript 31st Plains Conference, Columbia, Mo., on file at Oklahoma Archaeological Survey, Norman.

- 1974 An analysis of the Custer focus and its relationship to the Plains village horizon in Oklahoma. *Papers in Anthropology*, University of Oklahoma, vol. 15, no. 2, pp. 1-72.
- Lintz, Christopher R.
- 1976 The Panhandle aspect and its early relationship with the upper Republican phase, paper read at a symposium on the Central Plains tradition: internal dynamics and external relationships, at the joint Plains-Midwest Anthropological Conference, October 20-22, Minneapolis, MN.
- Lintz, Christopher and Bill (Ralph) White
- 1980 A chipped stone digging implement from the Oklahoma Panhandle. *Oklahoma Anthropological Society Newsletter*, vol. 28, no. 3, pp. 3-6.
- Lopez, David and Kenneth Keith (editors)
- 1980 Highway archaeological reconnaissance program: 1972-1979. *Oklahoma Highway Archaeological Survey, Papers in Highway Archaeology*, no. 6 in press).
- Muto, Guy R. and Roger S. Saunders
- 1978 Cimarron County, Oklahoma: a summary of historic and prehistoric cultural resources. MS on file at the State Historic Preservation Office, Oklahoma Historical Society, Oklahoma City.
- Nowak, Michael and Kristing Kranzush
- n.d. Report on excavations conducted in Cimarron County, Oklahoma in the fall of 1973 by Colorado College. MS on file at the Oklahoma Archeological Survey, 8 pp.
- Oakes, John Underhill
- 1953 The Lacy site, Garvin County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society*, vol. 1, pp. 17-24. Oklahoma City.
- Payne, R.W. and E.M. Payne
- 1976 Kokopelli. *Oklahoma Today Magazine*, vol. 26, no. 3, p. 34.
- Pillaert, Elizabeth
- 1963 The McLemore site of the Washita River focus. *Bulletin of the Oklahoma Anthropological Society*, vol. 11, pp. 1-113. Oklahoma City.
- Ray, Max A.
- 1961 A resurvey of Oklahoma archaeology (part I). *Oklahoma Anthropological Society Newsletter*, vol. 9, no. 8, pp. 1-7.
- 1961 A resurvey of Oklahoma archaeology (part II). *Oklahoma Anthropological Society Newsletter*, vol. 9, no. 9, pp. 6-11.
- 1961 A resurvey of Oklahoma archaeology (part III). *Oklahoma Anthropological Society Newsletter*, vol. 10, nos. 2 and 3, pp. 1-16. Norman.
- Renaud, E.B.
- 1929 Archaeological research in northeastern New Mexico and western Oklahoma. *El Palacio*, vol. 27, nos. 23 and 24. Santa Fe.
- 1929 Basketmakers in Oklahoma. *El Palacio*, vol. 27, pp. 187-188.
- 1929 A summer's expedition to northeastern New Mexico and western Oklahoma. *El Palacio*, vol. 27, pp. 247-248. Santa Fe.
- 1930 Colorado Museum. *El Palacio*, vol. 29, no. 2, pp. 146-148. Santa Fe.
- 1930 A summary of the prehistoric cultures of the Cimarron Valley. *El Palacio*, vol. 29, pp. 123-129. Santa Fe.
- Rucker, Alvin
- 1929 Cavern holds evidence of early tribes. *The Daily Oklahoman*, July 25, 1929, p. 14.
- Saunders, Roger S.
- n.d. The Kenton caves: examples of cultural resources in the western Oklahoma panhandle. MS on file at the Department of Anthropology, Norman, 10 pp.
- Saunders, Roger S. and Kenneth E. Saunders
- n.d. Distribution and density patterns of lithic materials in Cimarron County, Oklahoma. MS on file at the Oklahoma Archaeological Survey, 23 pp.
- Saunders, Roger
- 1973 The Zimm's site, a late prehistoric house site in western Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 21, no. 6.
- 1978 Archaeological resources of Black Mesa State Park, Cimarron County, Oklahoma. *Oklahoma Archaeological Survey, Archaeological Resource Report*, no. 7.
- Sayles, E.B.
- n.d. Excavation notes at Antelope Creek--with conjectural evolution of the slab house of the panhandle. Manuscript. Texas Tech University Museum, Lubbock.

- Schmitt, Karl
1950 The Lee site, Gv-3, of Garvin County, Oklahoma. *Bulletin of the Texas Archeological and Paleontological Society*, vol. 21, pp. 69-89. Lubbock.
- Schmitt, Karl and Raymond Toldan, Jr.
1953 The Brown site, Gd-1, Grady County, Oklahoma. *Bulletin of the Texas Archeological Society*, vol. 24, pp. 141-176. Austin.
- Schneider, Frederick
1965 Map of Stamper Found. *Oklahoma Anthropological Society Newsletter*, vol. 13, no. 8, p. 1.
1969 The Roy Smith site (Bv-14), Beaver County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society*, vol. 18, pp. 119-179.
- Shaeffer, James B.
1965 The Rhoton site, Tx-29. In: *Salvage archaeology in Oklahoma*, vol. 1. Papers of the Oklahoma Archaeological Salvage Project. *Archives of Archaeology*, no. 9, University of Wisconsin Press, Madison. Reprinted in *Bulletin of the Oklahoma Anthropological Society*, vol. 13, pp. 147-149.
- Sharrock, Floyd W.
1959 Preliminary report on the Van Schuyver site, Pottawatomie County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society*, vol. 7, pp. 33-40. Oklahoma City.
- Spencer, William H.
1980 Cultural resources of a proposed pipeline from Texas-Oklahoma state line to the Oklahoma-Kansas state line. Report prepared by Southern Archaeological Research Inc., Baton Rouge, LA, for Phillips Petroleum.
- Tainter, Joseph A.
1979 A functional analysis of the Croton Creek lithic scatter, Rogers Mills County, Oklahoma. *Bulletin of the Oklahoma Anthropological Society*, vol. 28, pp. 137-146.
- Thoburn, Joseph B.
1926 Progress report on Oklahoma. *Oklahoma Academy of Sciences Proceedings*, vol. 6, pp. 369-371.
1929 The prehistoric cultures of Oklahoma. *The Chronicles of Oklahoma*, vol. 7, no. 3, pp. 211-241.
1930 Professor Thoburn still digging. *The Oklahoma Engineer*, pp. 6-7.
1931 Ancient irrigation ditches on the plains. *The Chronicles of Oklahoma*, vol. 9, no. 1, pp. 56-62. Oklahoma City.
- Thoburn, Joseph B.
1931 The prehistoric cultures in Oklahoma. In *Archaeology of the Arkansas River valley*, W.K. Moorehead, compiler, Andover Press, Andover, Mass, pp. 53-82. 1931 Prehistoric irrigation works. *Professional Engineer*, vol. 16, no. 2, pp. 7-8.
1934 Excavation of an earthen mound on the Whisenhunt place, two miles north of Gate, Beaver County, Oklahoma. MS, Narrative Report to F.E.R.A. of W.P.A., Washington.
1935 Report of an archaeological exploration of a portion of the Cimarron River valley in Beaver County, Oklahoma and of the ancient village site on Sharp's Creek in the southwestern part of the same county. MS on file in Thoburn's papers, Oklahoma Historical Society, Oklahoma City, 11 pp.
- Wallace, Benny J.
1962 Prehistoric house patterns of Oklahoma. *Bulletin of the Oklahoma Anthropological Society*, vol. 10, pp. 27-68. Oklahoma City.
- White, Ralph W.
1971 A corner tanged knife from near Guymon, Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 19, no. 5, pp. 11.
- Winters, Joseph C.
1975 Maize remains from two western Oklahoma sites. MS on file at the Oklahoma Archaeological Survey, 3 pp.
- Wright, Muriel H. (editor)
1958 Oklahoma historical sites survey. *The Chronicles of Oklahoma*, vol. 36, no. 3, pp. 282-314.

TEXAS ARCHEOLOGICAL REPORTS

Adams, Tom

- 1970 A Clovis point of Alibates flint. Midland Archeological Society Newsletter, vol. 4, no. 1, p. 2, Midland, TX.

Alexander, Herbert L., Jr.

- 1963 The Levi site. A paleoindian campsite in central Texas. American Antiquity, vol. 28, no. 4, pp. 510-528.

Anderson, Bruce A.

- 1976 Overview of bison remains from the Plum Creek area, Lake Meredith Recreation area, Texas, National Park Service, Southwest Cultural Resources Center, Santa Fe, NM.

Anon

- 1966 Texas Alibates flint quarries declared a national monument. Lapidary Journal, vol. 19, no. 10, pp. 1117-1131.

Anthony, E.D., Jr., editor

- 1963 Alibates flint quarries. Panhandle Geological Society Field Trip Guide Book, September 14, Amarillo, TX.

Bandy, Philip A.

- 1977 A review of archaic cultures of the Texas panhandle. In: Transactions of the Twelfth Regional Archeological Symposium for Southeastern New Mexico and western Texas, El Paso, TX, pp. 15-25.

Bousman, C. Britt

- 1974 Archaeological assessment of Lake Meredith Recreation Area. Archaeological Research Program, Southern Methodist University.

Bryant, Vaughn M., Jr. and Harry J. Shafer

- 1977 Late Quaternary paleoenvironment of Texas: a model for the Archaeologist. Bulletin of the Texas Archeological Society, vol. 48, pp. 1-26.

Carter, Richard L. and Mary Ruth Carter

- 1958 The Pickett ruin in Hutchinson County, Texas. Manuscript on file at the Panhandle-Plains Historical Museum, Canyon, Texas.

Collins, Michael B.

- 1968 The Andrews Lake locality: new archeological data from the southern Llano Estacado, Texas. M.A. Thesis on file, University of Texas at Austin.

Corbyn, Ronald C.

- 1967 Archaeological-geomorphic survey of Big Canyon-Canadian River confluence. Manuscript on file Sanford Recreation Area, Sanford, Texas.
- 1967 Big Canyon burial, site 84, Park Service. Manuscript on file at Sanford Recreational Area, Sanford, Texas.

Cummings, Calvin R.

- 1969 Archaeological site survey for Bugbee Canyon access road right-of-way, Sanford Recreation Area, Texas. Manuscript on file at Sanford Recreation Area, Sanford, Texas.
- 1969 Alibates development outline. MS on file at Sanford Recreation Area, Sanford, Texas.

Davis, E.M.

- 1965 Alibates: an archaeological national monument in Texas. Texas Archeology, the Newsletter of the Texas Archeological Society, no. 9, p. 5.

Duffield, L.F.

- 1962 Archeology of the Sanford Reservoir in the Texas panhandle. Plains Anthropologist, vol. 7, no. 16, p. 79.
- 1964 Three panhandle aspect sites at Sanford Reservoir, Hutchinson County, Texas. Bulletin of the Texas Archeological Society, vol. 35, pp. 19-81.

Duffield, L.F.

- 1970 Some panhandle aspect sites in Texas: their vertebrates and paleo-ecology. PhD dissertation, University of Wisconsin, Madison.

Etchieson, Gerald Meeks

- 1978 A preliminary report on excavations at the South Ridge site, Lake Meredith Recreation Area, Hutchinson County, Texas. Report submitted to the National Park Service by the ARL, KRC, WTSU. Canyon.
- 1979 Archeological testing at the South Ridge site, Lake Meredith Recreation Area, Hutchinson County, Texas. Report submitted to the National Park Service, Southwest Region.

- n.d. A preliminary report on excavations at the Ozier site, Lake Meredith Recreation Area, Moore County, Texas. Report submitted to the National Park Service by the ARL, KRC, WTSU. Canyon.
- Etchieson, Gerald Meeks, Roberta D. Speer, and Jack T. Hughes
1977 An archeological survey of certain tracts in and near Caprock Canyons State Park in eastern Briscoe County, Texas. Report submitted to the Texas Parks and Wildlife Department by the ARL, KRC, WTSU, Canyon.
- Eyerly, T.L.
1907 The buried city of the panhandle. *The Student, Annual of the Canadian Academy*, pp. 29-36, Canadian, TX.
1912 The buried city of the panhandle. *The Archaeological Bulletin*, vol. 3, no. 1, Hico, Texas, pp. 1-5.
- Glasscock, Keith and Alma
1955 A preliminary report on CR-1, an Indian campsite in Moore County, Texas. *Panhandle-Plains Historical Review*, vol. 28, pp. 96-106.
- Green, Donald Edmund
1969 The irrigation frontiers of the Texas high plains, 1910-1960. Ph.D. dissertation, University of Oklahoma.
- Green, Donald Edmund
1973 Land of the underground rain: irrigation on the Texas high plains 1910-1970. University of Texas Press.
- Greer, John W.
1968 Notes on excavated ring midden sites, 1963-1968. *Bulletin of the Texas Archeological Society*, vol. 38, pp. 39-44.
- Guffee, Eddie J.
1976 The Merrell-Taylor Village site: an archeological investigation of pre-Anglo, Spanish-Mexican occupation on Quitaque Creek in Floyd County, Texas. Report submitted to the Texas Historical Foundation by the Archeological Research Laboratory, Llano Estacado Museum, Wayland Baptist College, Plainview, TX.
1979 The Plainview site: relocation and archeological investigation of a late PaleoIndian kill site in Hale County, Texas. Archeological Research Laboratory, Llano Estacado Museum. Plainview, Texas.
- Harrison, Billy R., and Bob T. Griffin
1973 An infant burial in the Texas panhandle. *Bulletin of the Texas Archeological Society*, vol. 44, pp. 61-68.
- Harrison, Billy R., and Henry C. Smith
1975 A test excavation of the Lake Theo site, Briscoe County, Texas. *Panhandle-Plains Historical Review*, vol. 48, pp. 70-106. Canyon, TX.
- Hester, Thomas R.
1972 An artifact of Alibates dolomite from the Rio Grande plain. *Texas Journal of Science*, vol. 24, no. 1, pp. 99-101.
- Hester, James J., and Fred Wendorf
1975 Paleoarchaeology of the Llano Estacado. In *Late Pleistocene Environments of the southern high plains*. Fort Burgwin Research Center Publication, no. 9, pp. 247-278. Southern Methodist University, Dallas.
- Hester, Thomas R.
1977b The current status of Paleoindian studies in southern Texas and north-eastern Mexico. In: Eileen Johnson (ed.), *Paleoindian Lifeways*. *The Museum Journal*, vol. 17, pp. 187-197.
in Early human populations of south and southwest Texas. *Archaeology*.
press
- Hobbs, Hulda R.
1941 Two Texas panhandle ruins. *El Palacio*, vol. 48, no. 6, pp. 121-129.
- Hofman, Jack
1974 The Hodge site Cu-40: a late prehistoric site on the southern plains. In (Hofman and others) *Reports of the ARKLA salvage project*. Oklahoma Archaeological Survey, Contract Archaeology Series no. 1, pp. 22-68.
1977 A Caddoan pipe from the Shawyer site in western Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 25, no. 7, pp. 7-11.

- Holden, W.C.
 1930 The Canadian valley expedition of March, 1930. Bulletin of the Texas Archeological and Paleontological Society, vol. 2, pp. 21-32.
 1932 Recent archaeological discoveries in the Texas panhandle. South-western Social Science Quarterly, vol. 13, no. 3, pp. 287-293.
- Holmes, Mary Ann and Claudette Marie Gilbert
 1979 Prehistoric panhandle farmers: the Roy Smith site. Oklahoma Archaeological Survey, Prehistoric People of Oklahoma Series, no. 3.
- Hood, H. Charles, and Jack T. Hughes
 1975 An archeological survey in the Lakeview watershed, report submitted to the Soil Conservation Service by the ARL, KRC, WTSU, Canyon.
- Hughes, Jack T.
 1952 An elephant hunt on the Merchant Ranch. Panhandle-Plains Historical Review, vol. 25, pp. 91-99, Canyon, TX.
 1959 In Notes and News. American Antiquity, vol. 24, no. 4, p. 454.
- Hughes, Jack T.
 1969 The Canyon City club cave, Randall County, Texas, report submitted to the Texas Historical Commission by West Texas State University, Canyon.
 1972 Archeology, pp. 2-30 to 2-45, in Ark-Red chloride control part I, areas VII, VIII, and X, Texas, report submitted to the U.S. Army Corps of Engineers by West Texas State University, Canyon.
 1976 Progress report on archeological survey and testing in the Red Deer Creek watershed, report submitted to the National Park Service by the ARL, KRC, WTSU, Canyon.
 1977 Assessment of the cultural resources of certain tracts in north-western Texas and eastern New Mexico, report submitted to South-western Public Service Company, Amarillo, TX.
 1977 Preliminary report on an archeological survey of certain tracts in and near Caprock Canyons State Park in eastern Briscoe County, Texas, report submitted to the Texas Parks and Wildlife Department by the ARL, KRC, WTSU, Canyon.
 1977 study of the cultural resources of five candidate sites for a nuclear power plant in the Texas panhandle, report submitted to Southwestern Public Service Company, Amarillo, TX.
 1977 Archeology of Palo Duro Canyon, MS submitted to the Panhandle-Plains Historical Review, Canyon, TX.
- Hughes, Jack T., and Eddie J. Guffee
 1976 Summary report on backhoe testing in the lower running water draw watershed, Hale and Castro counties, Texas, report submitted to the Soil Conservation Service.
- Hughes, Jack T., and H. Charles Hood
 1976 Archeological testing in the Lakeview watershed, Hall County, Texas, report submitted to the Soil Conservation Service by the ARL, KRC, WTSU, Canyon.
- Hughes, Jack T., and Patrick S. Willey
 1975 Assemblers, archeological salvage at Mackenzie Reservoir, report submitted to the Texas Historical Commission by the ARL, KRC, WTSU, Canyon.
- Hughes, Jack T., H. Charles Hood, Billy Pat Newsman, and Pollyanna B. Hughes
 1977 Final report on an archeological survey of the Red Deer Creek watershed in Gray, Roberts, and Hemphill counties, Texas, submitted to the National Park Service by the ARL, KRC, WTSU, Canyon.
- Hughes, Jack T.
 1979 Cultural resources. In An environmental profile of the Palo Duro Creek basin, pp. V-1 to V-117. Report submitted to the U.S. Army Corps of Engineers by Killgore Research Center, West Texas State University. Canyon.
- Johnson, Eileen
 1974 Zooarchaeology and the Lubbock Lake site. In History and prehistory of the Lubbock Lake site, edited by Craig C. Black. The Museum Journal, vol. 15, pp. 107-122. Texas Tech University, Lubbock.
- Johnson, Eileen, Vance T. Holliday, Michael J. Kaczor and Robert Stuckenrath
 1977 The Garza occupation at the Lubbock Lake site. Bulletin of the Texas Archeological Society, vol. 48, pp. 84-109.
- Keller, John Esten
 1975 The Black Dog village site, a panhandle aspect manifestation in Hutchinson County, Texas. Texas Highway Department Publications in Archaeology, report no. 5. Austin.

- Kelley, Charles J.
1959 The desert cultures and the Balcones phase: archaic manifestations in the Southwest and Texas. *American Antiquity*, vol. 24, no. 3, pp. 276-288.
- Kiser, Edwin L.
1977 The re-examination of Pedro de Castaneda's bone bed by geological investigations, MS submitted to the Bulletin of the Texas Archeological Society.
- Krieger, A.D.
1947 Description of artifacts. Fossil bison and associated artifacts from Plainview, Texas. (Sellards, Evans and Meade). *Bulletin, Geological Society of America*, vol. 58, pp. 927-954. Washington.
- Leighton, M.M.
1936 Geological aspects of the findings of primitive man, near Abilene, Texas. *Medallion Papers*, no. 24. Gila Pueblo, Globe, Arizona.
- Mason, J. Alden
1935 The place of Texas in pre-Columbian relationships between the United States and Mexico. *Texas Archaeological and Paleontological Society-Bulletin*, vol. 7, pp. 29-46.
- Mitchell, Jimmy L.
1975 Archaeological materials from the Palo Duro Creek area of Hansford County, Texas. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 46, pp. 217-231.
1976 An Alibates dolomite scraper from Wilson County, Texas. *Journal of the Southern Texas Archaeological Association*, vol. 3, no. 4, pp. 16-20, San Antonio.
1976 The Panhandle aspect and Apishapa focus of the southern plains, MS submitted to the *Plains Anthropologist*.
- Moorehead, Warren K.
1933 The importance of Texas as an archaeological field. *Texas Archaeological and Paleontological Society Bulletin*, vol. 5, pp. 9-13.
1938 The importance of Texas as an archeological field. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 10, pp. 9-13.
- Nance, C.R.
1972 Cultural evidence for the altithermal in Texas and Mexico. *South-western Journal of Anthropology*, vol. 28, pp. 169-192.
- National Park Service
1964 Sanford National Recreation Area, Texas; a proposal; a recreation planning report.
1975 National park service concerns and objectives for Alibates flint quarries and Texas panhandle pueblo culture national monument, paper prepared for public workshop, Frank Phillips College, May 29, Borger, TX.
- Newman, Billy Pat
1976 The archeological project of the Youth Conservation Corps at the Lake Meredith Recreation Area during the summer of 1976, report submitted to the National Park Service by the ARL, KRC, WTSU, Canyon.
- Newman, John H., Jr.
1974 Llano Estacado heritage: towards a regional cultural-development interpretive system, master's thesis, Texas Tech University, Lubbock.
- Parvin, Bob
1976 Prehistoric Pittsburg. *Texas Highways*, vol. 23, no. 10, pp. 34-38.
- Patterson, J.T.
1936 The corner-tang flint artifacts of Texas. *The University of Texas Bulletin* no. 3618, Bureau of Research in the Social Sciences, Study no. 18, *Anthropological Papers*, vol. 1, no. 4.
- Patterson, J.T.
1937 Supplementary notes on the corner-tang artifact. *The University of Texas Bulletin*, no. 3734. Bureau of Research in the Social Sciences, Study no. 25, *Anthropological Papers*, vol. 1, no. 5.
- Patterson, Leland W.
1973 Some Texas blade technology. *Bulletin of the Texas Archeological Society*, vol. 44, pp. 89-111.
- Pearce, W.M.
1936 A survey of the sand-hill camp sites of Lamb and Bailey counties. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 8, pp. 184-186.

- Randall, Mark E.
1970 The archaeology of the Lamb County, Texas area. Lower Plains Archeological Society Bulletin no. 1, pp. 43-53, Midland, TX.
- Rathbun, Fred C.
1979 Archaeological geology of Torres cave (5 LA 1310), Las Animas County, Colorado. Southwestern Lore, vol. 45, nos. 1-2, pp. 22-35.
- Reed, Erik K.
1936 Special report on archeological work at Palo Duro canyon. Manuscript on file at Panhandle-Plains Historical Museum, Canyon, TX.
1947 Review of culture complexes and chronology in northern Texas, by Alex D. Krieger. Bulletin of the Texas Archeological and Paleontological Society, vol. 18, pp. 157-159.
- Sharp, Jay W.
1969 An Indian burial. This is West Texas, West Texas Chamber of Commerce, vol. 3, no. 4, pp. 18-22.
- Slesick, L.M.
1977 A lithic tool cache in the Texas panhandle. Paper read at the annual meeting of the Texas Archeological Society, October 28-30, Arlington.
- Smith, Victor J.
1936 The pottery horizons of Texas. Texas Archaeological and Paleontological Society-Bulletin, vol. 8, pp. 94-112.
1938 A survey of Indian life in Texas, Circular no. 5. West Texas Historical and Scientific Society, Alpine.
- Sollberger, J.B. and Thomas R. Hester
1972 The Strohacker site: a review of pre-Archaic manifestations in Texas. Plains Anthropologist, 17 (58) part 1, pp. 326-344. Lincoln.
- Sorrow, William M.
1968 The Devil's Mouth site: the third season--1967. Papers of the Texas Archeological Salvage Project, vol. 14, pp. 1-70.
- Speer, Roberta D.
1975 Bison remains from the Rex Rodgers site. The Compass of Sigma Gamma Epsilon, vol. 52, no. 3, pp. 49-55. 1975 Fossil bison remains from the Rex Rodgers site, Briscoe County, Texas, M.S. thesis, West Texas State University, Canyon.
1976 Bison remains from the Rex Rodgers site, MS submitted to the Plains Anthropologist.
1978 Bison remains from the Rex Rodgers site. Plains Anthropologist, vol. 23, no. 82, pt. 2, pp. 113-127. Memoir 14.
- Stephenson, Robert L.
1950 Culture chronology in Texas. American Antiquity, vol. 16, no. 2, pp. 151-157.
- Studer, Floyd V.
1939 Report on Dept. of Archaeology and Paleontology to annual meeting of Panhandle-Plains Historical Society at Canyon, Texas, May 12, 1939. Panhandle-Plains Historical Review, vol. 12, pp. 91-95.
1952 Pueblo ruins in the Texas panhandle. In Handbook of Texas. Texas State Historical Association.
- Suhm, Dee Ann, and Edward B. Jelks
1962 Handbook of Texas archeology: type descriptions. Texas Archeological Society Special Publication 1 and Texas Memorial Museum Bulletin 4, Austin.
- Sutro, Livingston D.
1977 The archeological project of the Youth Conservation Corps at the Lake Meredith Recreation area during the summer of 1977, report submitted to the National Park Service by the ARL, KRC, WTSU, Canyon.
- Watts, W.C.
1963 Distribution of pottery in surface sites on the south plains of Texas. South Plains Archeological Society Bulletin, vol. 1, pp. 1-25, Lubbock, TX.
1939 Lake sites of the south plains of Texas. Bulletin of the Texas Archaeological and Paleontological Society, vol. 11, pp. 77-91.
- Weehler, Karen
1974 Trade theories concerning the people of the Antelope Creek focus as indicated by the dispersal of Alibates flint. Lower Plains Archaeological Society Bulletin, vol. 4, pp. 1-5.

- Weisendanger, Martin
1975 Beneath optima earth. *Oklahoma Today Magazine*, vol. 25, no. 4, pp. 6-8.
- Wheat, Joe Ben
1974 First excavations at the Lubbock Lake site. In: Craig C. Black (ed.), *History and Prehistory of the Lubbock Lake Site*. *The Museum Journal*, vol. 15, pp. 15-42.
- Willey, Patrick S. and Jack T. Hughes
1978 The Deadman Shelter site. In Hughes and Willey, 1978, pp. 149-190.
- Willey, Patrick S., Billy R. Harrison, and Jack T. Hughes
1978 The Rex Rodgers site. In Hughes and Willey, 1978, pp. 51-68.
1978 The Sand Pit site. In Hughes and Willey, 1978, pp. 233-253.
- Word, James H.
1963 Floydada Country Club site, 41-FL-1. *South Plains Archeological Society Bulletin*, vol. 1, pp. 37-63, Lubbock, TX.
- Word, James H. and Charles L. Douglas
1970 Excavations at Baker Cave, Val Verde County, Texas. *Texas Memorial Museum Bulletin*, vol. 16, pp. 1-151.
- Word, James H. and Anne Fox
1975 The Cogdell burial in Floyd County, Texas. *Bulletin of the Texas Archeological Society*, vol. 46, pp. 1-63.
- Word, James H.
1977 Site locations and functions of the eastern central Llano Estacado and adjacent rolling plains. *South Plains Archeological Society Bulletin*, vol. 3, pp. 25-36, Lubbock, TX.

WYOMING ARCHEOLOGICAL REPORTS

- Agogino, G.A. and W.D. Frankforter
1960 The Brewster site: an Agate Basin Folsom multiple component site in eastern Wyoming. *The Masterkey*, vol. 34, no. 3, pp. 102-107.
- Albanese, John
1974 Geology of the Casper Archeological site. In: *The Casper Site, a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, pp. 173-190.
- Bedord, Jean Newman
1974 Morphological variation in bison metacarpals and metatarsals. In: *The Casper Site, a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, pp. 199-240.
- Beiswenger, Jane
1974 Pollen report on the Casper site. In: *The Casper Site: a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, pp. 247-249, Appendix II.
- Frison, George C.
1965 A preliminary report on two sites at Piney Creek, Wyoming 48JO311 and 48JO312. *Plains Anthropologist*, vol. 10, no. 30, pp. 240-249.
1970 The Glenrock buffalo jump, 48CO304. *Plains Anthropologist*, Memoir 7.
1973 The Wardell buffalo trap 48SU301: communal procurement in the upper Green River basin, Wyoming. University of Michigan, *Anthropological Papers* no. 48.
- Frison, George C., Michael Wilson and Diane J. Wilson
1974 The Holocene stratigraphic archaeology of Wyoming: an introduction. In *Applied Geology and Archaeology: the Holocene History of Wyoming*, edited by Michael Wilson, pp. 108-127.
- Frison, George C.
1977 Paleoindian sites and economic orientations in the Big Horn basin. In *Paleoindian Lifeways*, edited by Eileen Johnson, pp. 97-116. *The Museum Journal* 17. Lubbock: West Texas Museum Association.
- Haynes, C. Vance, H. Irwin, C. Irwin-Williams and G. Agogino
1965 The Hell Gap site. VII INQUA Congress, Field Conference E Guidebook. Colorado University Press, Boulder.
- Haynes, C. Vance, Jr., and Donald C. Grey
1965 The Sister's Hill site and its bearing on the Wyoming postglacial alluvial chronology. *Plains Anthropologist*, vol. 10, no. 29, pp. 196-203.
- Irwin, H., C. Irwin-Williams, and G. Agogino
1965 The Hell Gap site: archaeological sketch. *The Wyoming Archaeologist*, vol. 8, no. 2, pp. 35-39.

- Reher, Charles A.
 1974 Population study of the Casper site bison. In *The Casper Site, a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, pp. 113-124.
- Renaud, E.B.
 1936 The archaeological survey of the high western plains. Seventh report. Southern Wyoming and Southwest South Dakota. University of Denver. Department of Anthropology. January.
 1938 The archaeological survey of the high western plains. Tenth report. Black's Fork Culture of Southwest Wyoming. University of Denver. Department of Anthropology. January.
 1940 The archaeological survey of the high western plains, twelfth report, further research work in the Black's Fort Basin, Southwest Wyoming, 1938-39. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wedel, Waldo, Wilfred M. Husted and John H. Moss
 1968a Mummy cave: prehistoric record from the Rocky Mountains of Wyoming. *Science*, vol. 160, pp. 184-186.
- Wilson, Michael
 1974 The Casper local fauna and its fossil bison. In: *The Casper Site, a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, pp. 125-171.
- Zeimens, George and Sandy Zeimens
 1974 Volumes of Bison astragali. In: *The Casper Site: a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, Appendix I, pp. 245-246.
- Zeimans, George M. et al.
 1978 The 1977 archeological program on the Big Horn, Shoshone and Medicine Bow National Forests. Office of the Wyoming State Archaeologist, University of Wyoming.

ARCHEOLOGY, GENERAL

- Agenbroad, Larry D.
 1978 Cody knives and the Cody complex in plains prehistory. A reassessment. *Plains Anthropologist*, vol. 23, no. 80, pp. 159-161.
- Agogino, George and James Duguid
 1963 Scottsbluff-Eden points and the Cody complex. *Southwestern Lore*, vol. 28, no. 4, pp. 73-75.
- Aikens, C. Melvin
 1966 Fremont--promontory-plains relationships in northern Utah. *University of Utah Anthropological Papers* no. 82. September.
- Baker, William E.
 1929 The first of the plains men. *Southwest Wilds and Water*.
- Bell, Robert E.
 1961 Relationships between the Caddoan area and the plains. *Texas Archaeological and Paleontological Society Bulletin*, vol. 31, pp. 53-64.
 1962 Paleo-Indian and archaic traditions. *Plains Anthropologist*, vol. 7, no. 16, pp. 89-92.
 1962 Precolumbian prairie settlements in the Great Plains. *Great Plains Journal*, vol. 2, no. 1, pp. 22-28. Lawton.
- Brown, Lionel A.
 1966 Temporal and spatial order in the central plains. *Plains Anthropologist*, vol. 11, pp. 294-301.
- Bryan, Kirk
 1941 Geologic antiquity of man in America. *Science*, vol. 93, pp. 505-541.
 1950 Geological interpretation of the deposits. In Haury, E., *Ventana Cave*, pp. 75-126. University of New Mexico and University of Arizona Press. Albuquerque and Tucson.
- Campbell, Robert G.
 1978 Southern high plains and upper Rio Grande prehistory. *Bulletin of the South Plains Archaeological Society*, vol. 4, pp. 7-18. Lubbock.
- Castetter, E.F., W.H. Bell, and A. Grove
 1938 The early utilization and the distribution of agave in the American Southwest. *Ethnobiological Studies in the American Southwest* 6. *University of New Mexico Bulletin* 335, Biological Series, vol. 5, no. 4, Albuquerque.
- Coffin, Roy C.
 1960 What we know of Folsom man. *Southwestern Lore*, vol. 26, no. 3, pp. 56-59.

- Dixon, Keith A.
1964 The acceptance and persistence of ring vessels and stirrup spout-handles in the Southwest. *American Antiquity*, vol. 29, no. 4, pp. 455-460.
- Drew, Darrell L.
1979 Early early man in North America and where to look for him: geomorphic contexts. *Plains Anthropologist*, vol. 24, no. 86, pp. 269-282.
- Dutton, Bertha P.
1964 Las Madres in the light of Anasazi migrations. *American Antiquity*, vol. 29, no. 4, pp. 449-454.
- Forbis, R.G.
1956 Early man and fossil bison. *Science*, vol. 123, pp. 327-328. Washington.
- Griffin, James B.
1946 Cultural change and continuity in eastern United States archaeology. In (Frederick Johnson ed) *Man in northeastern North America. Papers of the Robert S. Peabody Foundation for Archaeology*, vol. 3, pp. 37-95.
- Gunnerson, James H.
1956 Plains-promontory relationships. *American Antiquity*, vol. 22, pp. 69-72.
- Haury, Emil W.
1943 The stratigraphy of Ventana Cave, Arizona. *American Antiquity*, vol. 8, no. 3, pp. 218-223.
- Hughes, Jack T.
1977 The southwestern periphery of plains Caddoans, in *Mini-Symposium on Plains Caddoan Origins*, edited by Waldo R. Wedel, pp. 92-105, Smithsonian Institution, Washington, DC.
- Irwin, Henry
1968 The Itama: early late-Pleistocene inhabitants of the plains of the United States and Canada and the American southwest. Ph.D. dissertation, Harvard University, Cambridge.
1971 Developments in early man studies in western North America, 1960-1970. *Arctic Anthropology*, vol. 8, no. 2, pp. 42-67.
- Irwin-Williams, Cynthia
n.d. Paleo-Indian and archaic cultural systems in the southwestern United States. (MS prepared for the *Handbook of North American Indians, Southwest Volume*. Alfonso A. Ortiz, ed.)
1965 Preceramic origins of the Anasazi culture. *El Palacio*.
1973 The Oshara tradition: origins of Anasazi culture. *Eastern New Mexico University Contributions in Anthropology*, vol. 5, no. 1. Eastern New Mexico University, PaleoIndian Institute, Portales.
1977 Black boxes and multiple working hypotheses: reconstructing the economy of early southwest hunters. *The Kiva*, vol. 42, nos. 3-4, pp. 285-299.
- Jennings, Jesse D.
1947 An atlas of archeological sites within the reservoir located in the Missouri River basin. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1947 Outline of the prehistoric and historic Indian cultures of central Nebraska and Kansas. A supplement to the reconnaissance reports, recreational resources of the basins of the lower Platte River, Nebraska, the Republican River, Nebraska, and the Smoky Hill River, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Jennings, Jesse D.
1948 Plainsmen of the past, a review of the prehistory of the plains. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1955 The archeology of the plains: an assessment. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Jennings, Jesse D. and others
1956 The American southwest: a problem in cultural isolation. In (Wauchope ed.) *Seminars in Archaeology Society for American Archaeology* no. 11, pp. 61-127.
- Jennings, J.D.
1964 The desert west. In *Prehistoric man in the new world*, edited by J.D. Jennings and Edward Norbeck, pp. 149-174. University of Chicago Press, Chicago.
1974 *Prehistory of North America* (2nd ed.). McGraw-Hill, New York.
- Johnson, Eileen and Vance T. Holliday
1979 Prehistoric life on the southern high plains of Texas. *Archaeology*, vol. 32, no. 2, pp. 60-61.

- Jordan, Julia Anne
1960 Prehistory of the southern plains. *Papers in Anthropology*, University of Oklahoma, vol. 1, no. 1.
- Keller, Gordon N.
1961 The changing position of the southern plains in the late prehistory of the Great Plains. PhD dissertation, University of Chicago.
- Kivett, Marvin F.
1950 An archaic horizon? *Plains Archeological Conference Newsletter*, vol. 3, no. 2, pp. 46-48.
- Krieger, Alex D.
1949 The southern limits of the central plains culture complexes. *Proceedings of the Fifth Plains Archaeological Conference. Notebook 1*, Laboratory of Anthropology, University of Nebraska.
- Laughlin, W.S.
1967 Human migration and permanent occupation in the Bering Sea area. Pages 409-450 in D.M. Hopkins, editor, *The Bering Land Bridge*. Stanford: Stanford University Press.
- Lehmer, Donald J.
1954 Archeological investigations in the Oahe Dam area, South Dakota, 1950-51. *Smithsonian Institution, Bureau of American Ethnology Bulletin 158, River Basin Surveys Papers*, no. 7.
- Lehmer, Donald and Warren Caldwell
1966 Horizon and tradition in the northern plains. *American Antiquity*, vol. 31, pp. 511-516.
- Lister, Robert H.
1961 Twenty-five years of archaeology in the greater southwest. *American Antiquity*, vol. 27, no. 1, pp. 39-45.
- Mallery, Garrick
1883 Pictographs of the North American Indians. *Bureau of American Ethnology Annual Report, 1882-83*, Washington, DC.
- Malouf, Carling
1960 Tipi rings. *Southwestern Lore*, vol. 25, no. 4, pp. 3-5.
- Marshall, J.O.
1967 The Glen Elder focus. Unpublished MA thesis, Department of Anthropology, University of Nebraska.
- Mason, J. Alden
1930 Archaeological field work in North America during 1929. *American Anthropologist*, vol. 32, no. 2, pp. 361-362, 370-371.
- Moorehead, Warren K.
1920 The origin and development of the pueblo cliff dweller culture etc. *Phillips Academy, Andover, Mass.*
- Mulloy, William
1960 Late Prehistoric stone circles. *Southwestern Lore*, vol. 25, no. 4, pp. 1-5.
- Neuman, Robert W.
1963 Check-stamped pottery on the northern and central Great Plains. *American Antiquity*, vol. 29, no. 1, pp. 17-26.
1965 Atlatl weights. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Olsen, Stanley J.
1967 The importance of fragmentary vertebrate remains in archaeological collections. *Southwestern Lore*, vol. 32, no. 4, pp. 82-84.
- Poteet, Sybil
1938 The occurrence and distribution of beveled knives. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 10, pp. 245-262.
- Schmid, Elisabeth
1969 Cave sediments and prehistory. In Brothwell and Higgs, eds., *Science in Archaeology*, Second Edition, Praeger, New York, pp. 151-166.
- Scott, Douglas Dowell
1977 Historic fact vs. archaeological reality--a test in environmental reconstruction. *Ph.D. dissertation*, Department of Anthropology, University of Colorado. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.

- Sellards, E.H.
1938 Artifacts associated with fossil elephant. *Bulletin of the Geological Society of America*, vol. 49, pp. 999-1010.
- Spaulding, Albert C.
1949 Cultural and chronological classification in the plains area. *Plains Archeological Conference News Letter*, vol. 2, no. 2, pp. 13-16.
1949 The Middle Woodland period in the central plains. *Proceedings of the Fifth Plains Conference for Archeology*, University of Nebraska Laboratory of Anthropology Notebook no. 1, pp. 105-111.
- Spencer, Robert F. and Jesse D. Jennings et. al.
1965 *The native Americans: prehistory and ethnology of the North American Indian*. Harper and Row, N.Y.
- Stephenson, Robert L.
1965 Quaternary human occupation of the Plains. In *The Quaternary of the United States*, edited by H.E. Wright, Jr., and D.G. Frey, pp. 685-696. Princeton University Press, Princeton.
- Troike, Rudolph C.
1955 Anthropological theory and plains archeology. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 26, pp. 113-143.
- Wauchope, Robert (editor)
1956 *Seminars in archaeology, 1955*. *Memoirs of the Society for American Archeology*, no. 11.
- Wedel, Waldo R.
1934 Appendix: preliminary classification for Nebraska and Kansas cultures. *Nebraska History Magazine*, vol. 15, no. 3, pp. 251-255.
1935 Preliminary classification for Nebraska and Kansas cultures. *Nebraska History Magazine*, vol. 15, pp. 251-255.
1936 Some historical and ethnic aspects of Nebraska archeology. Ph.D. dissertation, University of California.
1947 Culture chronology in the Central Great Plains. *American Antiquity*, vol. 12, no. 3, pt. 1, pp. 148-156.
1949b Some provisional correlations in Missouri basin archaeology. *American Antiquity*, vol. 14, no. 4, pt. 1, pp. 328-339.
1949c A summary of recent field work in central plains archeology. In: *Proceedings of the Fifth Plains Conference for Archeology*, Notebook 1, pp. 3-5. Laboratory of Anthropology. The University of Nebraska, Lincoln.
1950 Notes on some plains-southwestern contacts in light of archaeology. In (Read and King eds.) *For the Dean: Essays in Anthropology in Honor of Bryon Cummings*. Southwestern Monuments Association.
1956 *Changing settlement patterns in the Great Plains*. Viking Fund Publications in Anthropology, no. 23. New York.
1961 Land of sun and wind and grass. In *Prehistoric Man on the Great Plains*, Waldo R. Wedel, pp. 20-45. University of Oklahoma Press.
1961 Some archeological problems in the Great Plains. *Great Plains Journal*, vol. 1, pp. 6-19.
1961 The Great Plains. In: *Prehistoric Man in the New World*, edited by Jesse D. Jennings and Edward Norbeck, pp. 193-222. University of Chicago Press.
- Wedel, Waldo R.
1961 Plains archaeology, 1935-1960. *American Antiquity*, vol. 27, no. 1, pp. 24-32.
1962 Note. *American Antiquity*, vol. 27, pp. 448. Salt Lake City.
1964 The Great Plains. In *Prehistoric Man in the New World*, edited by Jesse D. Jennings and Edward Norbeck. University of Chicago Press, pp. 193-220.
1978a Plains archeology in 1977. *Great Plains Journal*, vol. 17, pp. 25-39.
1979 House floors and native settlement populations in the central plains. *Plains Anthropologist*, vol. 24, no. 84, pt. 1, pp. 85-98.
- Wheat, Joe Ben
1971 Lifeways of early man in North America. *Arctic Anthropology*, vol. 8, pp. 22-31.
- Willey, Gordon R.
1958 Archaeological perspective on Algonkian-Gulf linguistic relationships. *Southwestern Journal of Anthropology*, vol. 14, no. 3, pp. 265-272.
1966 *An introduction to American archaeology*, vol. 1, North and Middle America. Prentice-Hall.

- Wilmsen, Edwin N.
 1968 Paleo-Indian site utilization. In *Anthropological Archaeology in the Americas*, edited by Betty J. Meggers, pp. 22-40. The Anthropological Society of Washington.
- Wood, W. Raymond
 1952 The square earth lodges of the central Great Plains. *Plains Archaeological Conference Newsletter*, vol. 5, no. 1, pp. 5-18. Reprinted in 1961, in *Plains Archeological Conference News Letter*, vols. 5-6, no. 1, pp. 5-17.
- Wood, W. Raymond
 1956 The Redbird focus. MS, master's thesis, University of Nebraska, Lincoln.
 1968 Preliminary report on archeological work in the Medicine Creek valley, Nebraska. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wormington, H.M.
 1964 *Ancient man in North America*, fifth edition. Denver: The Denver Museum of Natural History.
 1966 When did man come to North America? In: *Ancient Hunters of the Far West*, edited by Richard F. Pourade, pp. 109-124. The Union-Tribune Publishing Company, San Diego.
- Wyckoff, Don G.
 1961 The question of the origin of the central plains complex. *Papers in Anthropology*, vol. 3, no. 1, pp. 1-16. Norman.

TYPOLOGY

- Annand, Richard E.
 1967 A description and analysis of surface collected pottery from the Collbran region, Colorado. *Southwestern Lore*, vol. 33, no. 2, pp. 47-60.
- Baker, William E.
 1939 Flint artifacts relating to cultures on the Great Plains. *The Oklahoma Prehistorian*, vol. 2, no. 2, pp. 2-7.
- Baker, William E. and T.N. Campbell
 1959 Metal projectile points from the Oklahoma panhandle and vicinity. *Bulletin of the Oklahoma Anthropological Society*, vol. 7, pp. 51-54. Oklahoma City.
 1960 Artifacts from pre-ceramic sites in northeastern and southern New Mexico. *El Palacio*, vol. 70, pp. 78-86.
- Bell, Robert E., and Roland Scott Hall
 1953 Selected projectile point types of the United States. *Bulletin of the Oklahoma Anthropological Society*, vol. 1, pp. 1-16.
- Bell, Robert E.
 1955 Projectile points from the Oklahoma panhandle. *Oklahoma Anthropological Society Newsletter*, vol. 3, no. 7, pp. 4-5. Norman.
 1957 Clear fork gouges in Oklahoma. *Bulletin of the Texas Archaeological Society*, vol. 28, pp. 282-288. Austin.
- Burgh, Robert F.
 1961 White rock cord-marked pottery. *Plains Archeological Conference News Letter*, vol. 1, Reprint, pp. 26-27.
- Champe, John L.
 1949 The Sweetwater and Ash Hollow ceramic types re-examined. *Proceedings of the Fifth Plains Conference for Archeology*. University of Nebraska, Laboratory of Anthropology, Note book no. 1, pp. 43-44.
- Costello, Julia Garvin
 1972 A cluster analysis of projectile points from the Colorado central front range. MA thesis. 34 pp.
- Crabb, Martha Lewis
 1968 Some puebloan trade pottery from Panhandle aspect sites. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 38, pp. 83-89.
- Dale, Vincent
 n.d. The metal arrowpoints found in Texas County, Oklahoma and additional notes on metal arrowpoints. MS on file at Stovall Museum, Norman, Oklahoma, 27 pp.
 1967 The Garcia Plainview. *Oklahoma Anthropological Society Newsletter*, vol. 15, no. 3, p. 4.

- Dick, Herbert W.
1968 Six historic pottery types from Spanish sites in New Mexico. *Collected Papers in Honor of Lyndon Hargrave, B.H. Schroeder, ed., Papers of the Archeological Society of New Mexico*, no. 1, Museum of New Mexico, Santa Fe.
- Ellwood, P.B.
1975 Pottery distribution east of the Rockies in Colorado. *Denver Chapter, Colorado Archaeological Society, All Points Bulletin*, vol. 12, no. 2, pp. 3-10.
- Epstein, Jeremiah F.
1960 Burins from Texas. *American Antiquity*, vol. 26, no. 1, pp. 93-97.
- Figgins, J.D.
1934 Folsom and Yuma artifacts. *Proceedings of the Colorado Museum of Natural History*, vol. XIII, no. 2, pp. 1-8.
1935 Folsom and Yuma artifacts, part II. *Proceedings of the Colorado Museum of Natural History*, vol. XIV, no. 2, pp. 1-12.
- Fischel, Hans E.
1939 Folsom and Yuma culture finds. *American Antiquity*, vol. 4, no. 3, pp. 232-264.
- Hawley, Florence M.
1936 Field manual of prehistoric southwestern pottery types. *The University of New Mexico Bulletin, Whole Number 291, Anthropological Series*, vol. 1, no. 4. Revised November 1, 1950.
- Honea, Kenneth
1973 The technology of eastern puebloan pottery on the Llano Estacado. *Plains Anthropologist*, vol. 18, no. 59, pp. 73-88.
- Hughes, Jack T., editor
1972 Projectile point types of Texas and bordering states (chart). *West Texas State University Anthropological Society, Canyon*.
- Hughes, Jack T.
1975 Some early and northerly occurrences of the clear fork gouge, paper read at the Reunion Sobre Aspectos de Arqueologia e Historia del Noreste, April 23-26, Monterrey, Mexico.
- Husted, Wilfred M.
n.d. Pueblo pottery from northern Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1962 A proposed archaeological chronology for Rocky Mountain National Park based on projectile points and pottery. Master's Thesis, University of Colorado, Boulder.
1964 Pueblo pottery from northern Colorado. *Southwestern Lore*, vol. 30, no. 2, pp. 21-25.
- Kidder, A.V.
1932 The artifacts of Pecos. *Papers of the Phillips Academy Southwestern Expedition*, no. 6. New Haven.
- Kidder, A.V. and A.O. Shepard
1936 The pottery of Pecos, Vol. II: the glaze-paint, culinary, and other wares. *Papers of the Southwest Expedition*, no. 7. Phillips Academy, Andover, Yale University Press.
- Klippel, W.E.
1969 A contrastive statement on Upper Republican and Nebraska: chipped stone. In: *Two house sites in the central plains: an experiment in archaeology*, edited by W.R. Wood, pp. 99-101. *Plains Anthropologist, Memoir 6*. Lawrence.
- Lahren, Larry A. and Robson Bonnicksen
1974 Bone foreshafts from a Clovis burial in southwestern Montana. *Science* no. 186, pp. 147-150.
- Lobdell, John E.
1974 The Scoggin site: a study in McKean typology. *Plains Anthropologist*, vol. 19, no. 64, pp. 123-128.
- Perino, Gregory
1968 Guide to the identification of certain American Indian projectile points. *Oklahoma Anthropological Society, Special Bulletin 3*.
- Renaud, E.B.
1931 Prehistoric flaked points from Colorado and neighboring districts. *Proceedings of the Colorado Museum of Natural History*, vol. X, no. 2, pp. 1-19.
1932 Yuma and Folsom artifacts (new material). *Proceedings of the Colorado Museum of Natural History*, vol. XI, no. 2. Denver, November.

- 1934 The first thousand Yuma-Folsom artifacts. University of Denver. Department of Anthropology. October. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- 1935 Arrowhead types of Colorado. *Southwestern Lore*, vol. 1, pp. 4-6.
- Renaud, E.B.
1937 Folsom and Yuma points. *Bulletin of the Texas Archaeological and Paleontological Society*, vol. 8, pp. 74-88. September.
- 1937 Les pointes Americaines de Folsom et de Yuma. *Bulletin de la Societe Prehistorique Francaise*, no. 10. Paris. October.
- Rhoton, Charles, Jr.
1954 Outlines of projectile points found in western Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 2, no. 8, p. 4.
- 1955 Projectile points from the Oklahoma panhandle. *Oklahoma Anthropological Society Newsletter*, vol. 3, no. 7, pp. 4-5.
- Runyan, John W., and John A. Hedrick
1973 Pottery types of the SWFAS area, in *Transactions of the Eighth Regional Archeological Symposium for Southeastern New Mexico and western Texas*. Lea County Archeological Society, pp. 19-45, Hobbs, NM.
- Sigstad, John S.
1969 Nuzum site artifacts: pottery. *Plains Anthropologist*, vol. 14, no. 44, Memoir 6: 69-73.
- Wedel, W.R.
1970 Antler tine scraper handles in the central plains. *Plains Anthropologist*, vol. 15, no. 47, pp. 36-45. Lawrence.
- Wormington, H.M.
1949 A proposal for distributional studies of fluted and parallel flaked points in North America. *Plains Archeological Conference Newsletter*, vol. 2, no. 2, pp. 20-21.

TECHNOLOGY

- Anon.
1964 Alibates flint quarries: the panhandle's prehistoric Pittsburg. *The Shamrock* (Shamrock Oil and Gas Co.) Spring issue, pp. 8-11.
- Asquith, George B.
1975 Origin of the dolomite and chert, in *archeological salvage at pipe-line construction in Alibates National Monument*, by Jack T. Hughes and Kim E. Taylor, report submitted to the National Park Service and Colorado Interstate Gas Company, Amarillo, TX.
- Bandy, Phillip
1976 Lithic technology: a reconstruction of a northern Texas panhandle archaeological assemblage. M.A. thesis, Texas Tech University (41PT-8).
- 1977 The analysis of stone chipping technology: reconstruction by replication. Paper read at the annual meeting of the Western Social Science Association, April 21-23, Denver, CO.
- Bowers, R.L., and D.F. Reaser
1974 Local chert occurrence in Alibates dolomite, Alibates National Monument vicinity, northern panhandle of Texas. *Geological Society of America, Abstracts with Programs, Southcentral Meeting*, vol. 5, p. 96.
- Bradley, Bruce
1974 Comments on the lithic technology of the Casper site materials. In: *The Casper Site, a Hell Gap Bison Kill on the High Plains*, edited by George C. Frison, pp. 191-197.
- Dale, Vincent
1973 An experiment in ceramics. *Bulletin of the Oklahoma Anthropological Society*, vol. 22, pp. 217-222.
- Davis, Michael K.
1965 A study of wear on Washita River focus buffalo scapula tools. *Bulletin of the Oklahoma Anthropological Society*, vol. 13, pp. 153-158. Oklahoma City.
- Flenniken, J. Jeffrey
1978 Reevaluation of the Lindenmeier Folsom: a replication experiment in lithic technology. *American Antiquity*, vol. 43, no. 3, pp. 473-480.
- Frison, George C.
1968 A functional analysis of certain chipped stone tools. *American Antiquity*, vol. 33, pp. 149-155.

- Gould, C.N.
1921 Where did the Indians of the Great Plains get their flint? *Proceedings of the Oklahoma Academy of Sciences*, vol. 1, pp. 71-76.
- Grange, Roger T., Jr.
1974 Pawnee potsherds revisited: formula dating of a non-European ceramic tradition. *Conference on Historic Sites Archaeology Papers 1972*, vol. 7, pp. 318-336. University of South Carolina, Columbia.
- Green, F. Earl, and Jane Holden Kelley
1960 Comments on Alibates flint. *American Antiquity*, vol. 25, no. 3, pp. 413-414.
- Gunnerson, James H.
1961 A technique of pottery decoration. *Plains Archeological Conference News Letter*, vol. III, Reprint, p. 35.
- Hughes, Jack T.
1976 A review of some references to flint sources in the Texas panhandle, MS on file at the ARL, KRC, WTSU, Canyon.
- Kvamme, Kenneth L.
1977 Aboriginal sandstone quarries in the foothills of northeastern Colorado. *Southwestern Lore*, vol. 43, no. 3, pp. 22-26.
- Lopez, David and Roger Saunders
1973 Current lithic studies in Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 21, no. 9, pp. 1-4.
- Moomaw, Jack
1960 Indian gesso. *Southwestern Lore*, vol. 25, no. 4, p. 21.
- Renaud, E.B.
1939 The Clactonian flake technique in the western United States. *Bulletin of the Texas Archeological Society*, vol. 11, pp. 129-138. Abilene.
- Sollburger, J.B.
1971 A technological study of beveled knives. *Plains Anthropologist*, vol. 16, no. 53, pp. 209-218.
- Toll, H. Wolcott
1978 Quartzite qua lithic material in archaeology: qualities and quandaries with special reference to use-wear. *Plains Anthropologist*, vol. 23, no. 79, pp. 47-67.
- Wilmsen, Edwin N.
1970 Lithic analysis and cultural inference, a paleo-indian case. *Anthropological Papers of the University of Arizona*, no. 16.

ETHNOHISTORY

- Adams, E.B.
1953- Bishop Tamaron's visitation of New Mexico, 1760. *New Mexico Historical Review*, vol. 28,
1954 pp. 81-114, 192-221, 291-315; vol. 29, pp. 41-47.
- Blakeslee, Donald John
1975 The plains interband trade system: an ethnohistoric and archeological investigation. Ph.D. thesis, Department of Anthropology, University of Wisconsin-Milwaukee. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Bolton, Herbert E.
1949 Coronado: knight of pueblos and plains. University of New Mexico Press, Albuquerque.
- Bowman, Peter W.
1968- Some observations on Ulibarri's route and the location of Santo Domingo of El Cuartelejo.
1969 *Kansas Anthropological Association Newsletter*, vol. 14, nos. 4-5, pp. 1-23.
- Duffield, Lathel F.
1965 The Taovayas village of 1759: In Texas or Oklahoma? *Great Plains Journal*, vol. 4, no. 2, pp. 39-48. Lawton.
- Forbes, Jack D.
1960 Apache Navajo and Spaniard. Norman: University of Oklahoma Press.
- Hammond, George P. and Agapito Rey
1966 The rediscovery of New Mexico, 1580-1594. Albuquerque: University of New Mexico Press.
- Kenner, Charles L.
1969 A history of New Mexico-Plains Indian relationships. University of Oklahoma Press.

- Matson, Daniel S. and Albert H. Schroeder
 1957 Cordero's description of the Apache-1796. In: *New Mexico Historical Review*, vol. 32, no. 4. Albuquerque.
- Newcomb, W.W. and W.T. Field
 1967 An ethnohistoric investigation of the Wichita Indians in the southern plains. In (Bell, Jelks and Newcomb, eds.) *A pilot study of Wichita Indian archaeology and ethnohistory N.S.F.* final report, grant GS-964, pp. 240-395.
- Newcomb, W.W., Jr.
 1970 Summary of Kiowa-Apache history and culture. *Bulletin of the Texas Memorial Museum*, 17, pp. 1-28.
- Reichart, Milton
 1977 On the trail of Bourgmont, a personal bicentennial project. *Kansas Anthropological Association Newsletter*, vol. 23, nos. 4 and 5, pp. 1-79.
- Schroeder, Albert H.
 1960 A study of the Apache Indians, part 1: the Apaches and their neighbors, 1540-1700. Santa Fe.
 1962 A reanalysis of the routes of Coronado and Onate into the Plains in 1541 and 1601. *Plains Anthropologist*, vol. 7, no. 15, pp. 2-23.
 1965 A brief history of the southern Utes. *Southwestern Lore*, vol. 30, no. 4, pp. 53-78.
- Secoy, Frank R.
 1951 The identity of the "Padouca"; an ethnohistorical analysis. *American Anthropologist*, vol. 53, no. 4, pt. 1, pp. 525-542.
- Shine, Father Michael A.
 1915 The Nebraska aborigines as they appeared in the eighteenth century. *Nebraska Academy of Sciences Publications*, vol. 9, no. 1, pp. 13-22.
- Thomas, Alfred Barnaby
 1958 The Jicarilla Apache Indians, a history (1598-1888). University of Alabama, Birmingham.
- Wedel, Mildred M.
 n.d. Ethnohistoric approach to plains Caddoan origins. In *Mini-symposium on Plains Caddoan Origins*. Symposium Smithsonian Institution, November 16, 1976. Manuscript.
 1979 The ethnohistoric approach to plains Caddoan origins. *Nebraska History*, vol. 60, no. 2, pp. 183-196.
- Winship, George Parker
 1893 The Coronado expedition, 1540-1542. Bureau of American Ethnology, 14th Annual Report, 1892-1893, Washington, DC.

ETHNOGRAPHY

- Beals, Dr. Ralph L.
 1935 Ethnology of Rocky Mountain National Park: the Ute and Arapaho. National Park Service. Berkeley, California. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Carlson, G.G., and V.H. Jones
 1940 Some notes on uses of plants by the Comanche Indians. *Papers of the Michigan Academy of Science, Arts, and Letters*, vol. 25, pp. 517-542.
- Castetter, Edward F.
 1935 Uncultivated native plants used as sources of food. University of New Mexico, Biological Series, vol. 4, no. 1.
- Dorsey, George A.
 1904 Mythology of the Wichita. Carnegie Institution of Washington, Publication 21.
 1906 The Pawnee: mythology. Carnegie Institution of Washington, Publication 59.
- Driver, Harold E. and William C. Massey
 1957 Comparative studies of North American Indians. *Transactions of the American Philosophical Society, New Series*, vol. 47, pt. 2. Philadelphia.
 1961 Indians of North America. University of Chicago Press.
- Ewers, John C.
 1980 Climate, acculturation, and costume, a history of women's clothing among the Indians of the southern plains. *Plains Anthropologist*, vol. 25, no. 87, pp. 63-82.

- Gilmore, M.R.
 1913 The aboriginal geography of the Nebraska country. *Proceedings, Mississippi Valley Historical Association*, vol. 6, pp. 317-331.
 1919 Uses of plants by the Indians of the Missouri River region. *Bureau of American Ethnology Thirty-third Annual Report*, pp. 43-154.
- Howbert, Irving
 1970 Indians of the Pikes Peak region. The Rio Grande Press, Inc., Glorieta, New Mexico.
- Kroeber, A.L.
 1939 Cultural and natural areas of native North America. *University of California, Publications in American Archaeology and Ethnology*, vol. 38.
- Lowie, Robert H.
 1954 Indians of the plains. *Anthropological Handbook No. 1*, American Museum of Natural History, pp. 2-9, fig. 2.
- McAllister, J. Gilbert
 1970 Daveko, Kiowa-Apache medicine man. *Bulletin of the Texas Memorial Museum*, 17, pp. 31-61.
- Newcomb, W.W., Jr.
 1960 Indian tribes of Texas. *Bulletin of the Texas Archeological Society*, vol. 29 (for 1958), pp. 1-34.
 1961 The Indians of Texas from prehistoric to modern times. The University of Texas Press, Austin.
- Olin, Caroline
 1979 Recording the roots of Navajo culture. *Exxon USA*, vol. 19, no. 2, pp. 26-31.
- Parks, Douglas R.
 n.d. Linguistic contribution to northern Caddoan prehistory. In *Mini-symposium on Plains Caddoan Origins*. Symposium Smithsonian Institution, November 16, 1975. MS.
- Renaud, E.B.
 1927 The Indians of Colorado. *University of Colorado semicentennial publications, 1887-1927*, vol. IV. Colorado: short studies of its past and present. Chapter 2, November, 1927. Boulder, Colorado.
- Vestal, Paul A., and Richard E. Schultes
 1939 The economic botany of the Kiowa Indians. Cambridge, Botanical Museum.
- Wheat, Joe Ben
 1954 Kroeber's formulation of the southwestern culture area. *University of Colorado Studies Series in Anthropology*, no. 4, pp. 23-44.
- Wissler, Clark
 1931 The American Indian. (2nd ed.) New York, pp. 218-221, fig. 59.
- Witty, Thomas A., Jr. and Wendell P. Frantz
 1964 Historic uses of dogs among the plains Indians. *Kansas Anthropological Association Newsletter*, vol. 9, nos. 4-5.
- Wright, Gary A.
 1978 The Shoshonean migration problem. *Plains Anthropologist*, vol. 23, no. 80, pp. 113-137.

PHYSICAL ANTHROPOLOGY

- Bass, William M.
 1961 A preliminary survey of human skeletal material from archaeological sites in Nebraska. *Plains Anthropologist*, vol. 6, no. 12, pt. 2, pp. 108-109.
 1961 The variation in physical types of the prehistoric plains Indians. Ph.D. dissertation, University of Pennsylvania. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
 1964 The variation in physical types of the prehistoric plains Indians. *Plains Anthropologist*, vol. 9, no. 24, Memoir I, pp. 65-145.
- Bass, William M. and James H. Head
 1980 Human skeletal material from a late archaic site in Kansas. In *Salvage archeology of the John Redmond Lake, Kansas*, edited by Thomas A. Witty, Jr. Kansas State Historical Society, Anthropological Series, no. 8, pp. 174-185.

- Doran, Glen H. and Robert M. Malina
1975 Skeletal material from the Cogdell burial in Floyd County, Texas. *Bulletin of the Texas Archeological Society*, vol. 46, pp. 65-69.
- Figgins, J.D.
1935 New world man. *Proceedings of the Colorado Museum of Natural History*, vol. XIV, no. 1, pp. 1-9.
- Finnegan, Michael
1978 Human skeletal remains from Bradford House III, site 5 JF 52, Jefferson County, Colorado. *Plains Anthropologist*, vol. 23, no. 81, pp. 221-234.
- Jantz, Richard L., Douglas W. Owsley, and P. Willey
1978 Craniometric relationships of central plains populations. Pp. 144-156 in *The Central Plains Tradition: Internal Development and External Relationships*, edited by Donald J. Blakeslee. Report no. 11, Office of State Archaeologist, Iowa City.
- Johnson, Jerry and K. Richard McWilliams
1978 Physical evidence on the origins of the panhandle aspect. Paper read at 88th Annual Nebraska Academy of Sciences.
- McKern, Thomas W.
1964 Indian skeletal material from the Jim Arnold site. *Bulletin of the Texas Archeological Society*, vol. 35, pp. 95-100.
- McWilliams, K. Richard and Jerry L. Johnson
n.d. Physical evidence on the origins of the panhandle aspect people. *Plains Anthropologist* (in press).
1979 Physical evidence on the origin and fate of the panhandle aspect people. *Plains Anthropologist*, vol. 24, no. 85, pp. 249-253.
- Patterson, David K.
1974 An analysis of human skeletal materials from the Antelope Creek focus of northern Texas. M.A. thesis, Eastern New Mexico University, Portales.
- Patterson, Deborah E.
1974 Dental variation among the panhandle aspect populations. M.A. thesis, Eastern New Mexico University, Portales.
- Stewart, T.D.
1959 Description of the skeletal remains from Doniphan and Scott counties, Kansas. In *An Introduction to Kansas Archeology*, by Waldo R. Wedel. Smithsonian Institution, Bureau of American Ethnology, Bulletin 174, pp. 669-693.
- Turner, Kenneth R. and William M. Bass
1970 A human skeleton from 14BT467, Barton County, Kansas. *Kansas Anthropological Association Newsletter*, vol. 15, no. 5.
- Ubelaker, D.H. and R.L. Jantz
1979 Plains Caddoan relationships: the view from craniometry and mortuary analysis. *Nebraska History*, vol. 60, no. 2, pp. 249-259.
- Willey, Patrick S. and William M. Bass
1969 A study of a Kansa child from the Doniphan site, 14DP2, Doniphan County, Kansas. *Kansas Anthropological Association Newsletter*, vol. 15, no. 1, pp. 1-7.
- Willey, P. and D.H. Ubelaker
1976 Notched teeth from the Texas panhandle. *Journal of the Washington Academy of Science*, vol. 66, no. 4, pp. 239-246. Washington, DC.

HUMAN ECOLOGY

- Antevs, Ernst
1937 Climate and early man in North America. *Early Man*, J.B. Lippincott and Co., Philadelphia.
- Aschmann, Homer
1958 Great Basin climates in relation to human occupance. *University of California Archeological Survey, Report 42*, pp. 23-40.
- Baumhoff, M.A. and R.F. Heizer
1965 Postglacial climate and archaeology in the desert west. In *The Quaternary of the United States*, edited by H.E. Wright, Jr. and D.G. Frey, pp. 697-707. Princeton University Press, Princeton.

- Butzer, Karl W.
 1964 Environment and archaeology. Aldine, Chicago.
 1971 Environment and archaeology: an ecological approach to prehistory. Aldine, Chicago.
- Carter, G.F.
 1945 Plant geography and culture history in the American southwest. Viking Fund Publications in Anthropology, no. 5, New York.
- Dasmann, R.
 1959 Environmental limiting factors. Environmental Conservation, Random House, N.Y.
- Dort, Wakefield, Jr. and J. Knox Jones, Jr., editors
 1970 Pleistocene and Recent environments of the central Great Plains. Department of Geology, University of Kansas, Special Publication 3. Lawrence: The University Press of Kansas.
- Fitting, J.E.
 1968 Environmental potential and the postglacial readaptation in eastern North America. American Antiquity, vol. 33, no. 4, pp. 441-445.
- Frison, George C.
 1975 Man's interaction with Holocene environment on the plains. Quaternary Research, vol. 5, no. 2, pp. 289-300.
 1978 Animal population studies and cultural inference. In: Bison Procurement and Utilization: a symposium, edited by Leslie B. Davis and Michael Wilson, pp. 44-52. Plains Anthropologist, Memoir 14.
- Glassow, Michael A.
 1972 Changes in the adaptations of the southwestern basketmakers: a systems perspective. In: Contemporary Archaeology, Mark P. Leone, ed., pp. 289-301. Carbondale: Southern Illinois University Press.
- Gorman, Frederick
 1972 The Clovis hunters: an alternate view of their environment and ecology. In Contemporary Archaeology, edited by Mark P. Leone, pp. 206-221. Carbondale: Southern Illinois University Press.
- Hambridge, Gove (editor)
 1942 Climate and man. In Yearbook of Agriculture, 1941, pp. 798-808, 1011-1024. U.S. Department of Agriculture, Washington, D.C.
- Harris, Arthur H.
 1977 Biotic environments of the Paleoindian. In Paleoindian Lifeways, edited by Eileen Johnson, pp. 1-12. The Museum Journal 17. Lubbock: West Texas Museum Association.
- Haynes, C. Vance
 1971 Time, environment and early man. Arctic Anthropology, vol. 8, no. 2, pp. 3-14.
- Helm, June
 1962 The ecological approach in Anthropology. The American Journal of Sociology, vol. 67, no. 6, pp. 630-639.
- Hester, J.J.
 1968 The agency of man in animal extinctions. In: Pleistocene Extinctions: the Search for a Cause, edited by P.S. Martin and H.E. Wright, Jr., pp. 155-168, Yale University Press.
- Hornaday, W.L.
 1889 The extermination of the American bison. Smithsonian Institution Annual Report, 1887, vol. II, pp. 367-548.
- Hughes, Jack
 1950 Archeology and environment in the western Great Plains. Proceedings of the Sixth Plains Archeological Conference (1948). Anthropological Papers no. 11, pp. 100-104. Dept. of Anthropology, University of Utah.
- Hurt, W.R.
 1966 The altithermal and the prehistory of the northern plains. Quaternaria, vol. 8, pp. 101-114.
- Irwin-Williams, Cynthia and C. Vance Haynes
 1970 Climatic change and early population dynamics in southwestern United States. Quaternary Research, 1, pp. 59-71.

- Jelinek, A.J.
 1957 Pleistocene faunas and early man. Michigan Academy of Science Papers, vol. 42, pp. 225-237.
 1967 Man's role in the extinction of Pleistocene faunas. Pages 193-200 in P.S. Martin and H.E. Wright, Jr., editors, Pleistocene Extinctions: the Search for a Cause. New Haven. Yale University Press.
- Johnson, Eileen
 1977 Animal food resources of paleoindians. In Paleoindian Lifeways, edited by Eileen Johnson, pp. 65-77. The Museum Journal 17. Lubbock: West Texas Museum Association.
- Johnson, Willard D.
 1901- The high plains and their utilization. U.S. Geological Survey Annual Reports, vol. 21, pt. 4,
 1902 pp. 601-741; vol. 22, pt. 4, pp. 631-669.
- Johnston, Alexander
 1969 Man's utilization of the flora of the northwest plains. Post Pleistocene man and his environment on the northern plains. The Student Press, University of Calgary, Alberta.
- Johnston, W.A.
 1933 Quaternary geology of North America in relation to the migrations of man. In D. Jenness The American Aborigines, Their Origin and Antiquity, Fifth Pacific Science Congress, pp. 9-45.
- Kincer, J.B.
 1923 The climate of the Great Plains as a factor in their utilization. Annals of the Association of American Geographers, vol. 13, no. 2.
- Kirkpatrick, David T.
 1975 Basketmaker food plants from the Cimarron district, northeastern New Mexico. M.A. research paper, Department of Anthropology, Washington State University, Pullman.
- Kivett, Marvin F.
 1950 Archeology and climatic implications in the central plains. Proceedings of the Sixth Plains Archeological Conference (1948). Anthropological Papers, no. 11, pp. 88-89. Dept. of Anthropology, University of Utah.
- Knudson, Ruthann
 1970 Hypsithermal cultures on the high plains: a suggested model. Paper presented at the Thirty-fifth Annual Meeting of the Society for American Archaeology at Mexico City, May.
- Lehmer, Donald J.
 1970 Climate and culture history in the middle Missouri valley, in Pleistocene and Recent Environments of the Central Great Plains, edited by W. Dort, Jr. and J. Knox Jones, Jr. University Press of Kansas, Lawrence. Mackintosh, W.A.
 1934 Prairie settlement, the geographic setting. Canadian Frontiers of Settlement, vol. 1.
- Malde, H.E.
 1964 Environment and man in arid America. Science, vol. 145, pp. 123-129.
- Mather, John R.
 1954 The effect of climate on the new world migration of primitive man. Southwestern Journal of Anthropology, vol. 10, no. 3, pp. 304-321.
- Oldfield, F.E. and James Schoenwetter
 1964 Late Quaternary environments and early man on the southern high plains. Antiquity, vol. 38, no. 151, pp. 226-229. Gloucester, England.
- Quimby, George I., Jr.
 1954 Cultural and natural areas before Kroeber. American Antiquity, vol. 19, no. 4, pp. 317-331.
- Sauer, Carl O.
 1944 A geographic sketch of early man in America. Geographical Review, vol. 34, no. 4, pp. 529-573.
 1948 Environment and culture during the last deglaciation. American Philosophical Society Proceedings, vol. 92, no. 1, pp. 65-77.
- Schoenwetter, James
 1970 Archaeological pollen studies of the Colorado plateau. American Antiquity, vol. 35, no. 1, pp. 35-48.
- Schroeder, Albert H.
 1967 Themes of environmental adaptation and response in southwestern national park system areas. Southwestern Lore, vol. 33, no. 2, pp. 37-46.

- Sears, Paul B.
1951 Climate and culture: new evidence. *Science*, vol. 114, no. 2950, pp. 46-47.
- Sears, Paul B.
1958 Environment and culture in retrospect. In *Climate and Man in the Southwest*, edited by Terah L. Smiley, University of Arizona Bulletin, vol. 28, no. 4, Program in Geochronology, Contribution no. 6. Tucson.
- Thornthwaite, C. Warren
1941 Climate and settlement in the Great Plains. *Yearbook of Agriculture 1941: Climate and Man*, Washington, pp. 177-187.
- Trewartha, Glenn T.
1941 Climate and settlement of the subhumid lands. In *Climate and Man*, pp. 167-176. *Yearbook of Agriculture*, 1941. Washington.
- United States Department of Agriculture
1938 Soil and men. United States Department of Agriculture, *Yearbook of Agriculture 1938*. Washington.
- Wedel, Waldo R.
n.d. Holocene cultural adaptations in the Republican River basin. In: *The Great Plains, Environment and Culture*, edited by Brian W. Blouet and Frederick C. Luebke. University of Nebraska Press for the Center for Great Plains Studies. Lincoln.
1947 Prehistory and environment in the central Great Plains. *Transactions of the Kansas Academy of Science*, vol. 50, no. 1, pp. 1-18.
1953 Some aspects of human ecology in the central plains. *American Anthropologist*, vol. 55, pp. 499-514.
1957 The central North American grassland: man-made or natural? *Studies in Human Ecology*, pp. 39-69. *Social Science Monographs*, III.
1963 The high plains and their utilization by the Indian. *American Antiquity*, vol. 29, no. 1, pp. 1-16.
- Wendland, Wayne M.
1978 Holocene man in North America: the ecological setting and climatic background. *Plains Anthropologist*, vol. 23, no. 82, pt. 1, pp. 273-287.
- Wendorf, D.F.
1961 An interpretation of late Pleistocene environments of the Llano Estacado. In *Paleoecology of the Llano Estacado*, assembled by D.F. Wendorf, pp. 115-133. Fort Burgwin Research Center Publication 1.
- Wendorf, Fred (editor)
1961 *Paleoecology of the Llano Estacado*. Fort Burgwin Research Center Publication 1, Rancho de Taos, NM, pp. 1-144.
- Wendorf, Fred and James Hester
1962 Early man's utilization of the Great Plains environment. *American Antiquity*, vol. 28, no. 2, pp. 159-171.
1970 *Paleoecology of the Llano Estacado*. Publications of the Fort Burgwin Research Center, vol. 2, in press.
- Wilson, Michael
1978 Archaeological kill site populations and the Holocene evolution of the genus *Bison*. In *Bison Procurement and Utilization: a Symposium*, edited by Leslie B. Davis and Michael Wilson, pp. 9-22. *Plains Anthropologist*, Memoir 14.
- Wissler, Clark
1926 *The relation of nature to man in aboriginal America*. New York.
- Woodbury, Richard B.
1961 Climatic changes and prehistoric agriculture in the southwestern United States. *New York Academy of Sciences, Annals*, vol. 95, Article 1. New York.

MODERN ENVIRONMENT, GENERAL

- Bailey, Vernon
1913 Life zones and crop zones of New Mexico. *North American Fauna*, no. 35, U.S. Dept. of Agriculture, Washington.
- Bastin, Edson S. and James M. Hill
1917 Economic geology of Gilpin County and adjacent parts of Clear Creek and Boulder counties, Colorado. U.S. Geological Survey, "Professional Paper", no. 94, Washington.

- Marr, J.W. and R.E. Marr
1973 Environment and phenology in the forest-tundra ecotone, front range, Colorado. Arctic and Alpine Research, vol. 5, no. 3, pt. 2, pp. A65-A66.
- McComb, A.L. and W.E. Loomis
1944 Subclimax prairie. Bulletin, Torrey Botany Club, vol. 41, pp. 46-76.
- Moenke, Helen
1971 Ecology of Colorado mountains to Arizona deserts. Denver Museum of Natural History, Museum Pictorial no. 20.
- Ramaley, Francis and W.W. Robbins
1926 Colorado. In Naturalist's guide to the Americas, edited by Victor Shelford. Ecological Society of America.
- Reher, Charles A.
1978 Buffalo population and other deterministic factors in a model of adaptive process on the shortgrass plains. In Bison Procurement and Utilization: a Symposium, edited by Leslie B. Davis and Michael Wilson, pp. 23-39. Plains Anthropologist, Memoir 14.
- Rodeck, Hugo C. (ed.)
1964 Natural history of the Boulder area. University of Colorado Museum Leaflet number 13. Boulder.
- Shelford, Victor E.
1963 The ecology of North America. University of Illinois Press, Urbana.
- Stewart, Omer C.
1953 Why the Great Plains are treeless. Colorado Quarterly, vol. 2, no. 1, pp. 40-50.
- Strong, William D.
1935 The environmental setting. In An Introduction to Nebraska Archeology. Smithsonian Miscellaneous Collections, vol. 93, no. 10, pp. 30-39.
- Tannehill, I.R.
1947 Drought, its causes and effects. Princeton University Press.
- Thornthwaite, C. Warren
1936 The Great Plains. In Goodrich, Carter, Allin, Bushrod W., Thornthwaite, C. Warren, and others, Migration and Economic Opportunities, the Report of the Study of Population Redistribution, pp. 202-250. Philadelphia and London.
- Tomanek, G.W. and G.K. Hulett
1970 Effects of historical droughts on grassland vegetation in the central Great Plains: in Pleistocene and Recent Environments in the Central Great Plains, eds. W. Dort, Jr. and J.K. Jones, Jr., pp. 203-210. Department of Geology, University of Kansas Special Publication 3. University of Kansas Press, Lawrence.
- U.S. Department of Agriculture
1936 Atlas of American agriculture. Physical basis including land relief, climate, soils, and natural vegetation of the United States, Bureau of Agricultural Economics.
- Webb, W.P.
1931 The Great Plains. Boston, Ginn and Company, pp. 1-9.
- Wolcott, R.H.
1926 In Shelford, Victor E.: Naturalist's Guide to the Americas. Baltimore. Pp. 519-524.
- Yocum, Charles, William Weber, Richard Beidleman and Donald Malik
1969 Wildlife and plants of the southern Rocky Mountains. Healdsburg, California: Naturegraph Publishers.

MODERN CLIMATE

- Baerreis, David A. and Reid A. Bryson
1965 Historical climatology and the southern plains: a preliminary statement. Bulletin of the Oklahoma Anthropological Society, vol. 13, pp. 69-75.
- Barry, Roger
1972 Climatic environment of the east slope of the Colorado front range. Occasional paper no. 3, Institute of Arctic and Alpine Research.
1973 A climatological transect on the east slope of the front range, Colorado. Arctic and Alpine Research, vol. 5, no. 2, pp. 89-110.
- Bates, C.G.
1935 Climatic characteristics of the plains region. In Possibilities of Shelterbelt Planting in the Plains Region, U.S. Forest Service, pp. 82-110.

- Becker Clarence F. and John D. Alyea
 1964 Temperature probabilities in Wyoming. University of Wyoming, Agricultural Experiment Station Bulletin 415. Laramie.
 1964 Precipitation probabilities in Wyoming. University of Wyoming, Agricultural Experiment Station Bulletin 415. Laramie.
- Berry, Joseph W.
 1959 Climates of the states - Colorado. In *Climatography of the United States*, no. 60-65. U.S. Department of Commerce, Environmental Services Administration, Environmental Data Service. Washington, D.C.
 1968 The climate of Colorado. *Climatography of the United States* no. 60-5. United States Department of Commerce, Environmental Data Service, Washington, D.C.
 1978 Climate of Colorado. In *Climates of the States*, edited by James A. Ruffner, pp. 153-175. Gale Research Co., Detroit.
- Bertolin, Gary
 1970 A climatology of the Pawnee National Grasslands. Unpublished M.S. thesis, Colorado State University, Fort Collins.
- Blumenstock, David I. and C. Warren Thornthwaite
 1941 Climate and the world pattern. In: *Climate and Man*, Yearbook of Agriculture, 1941. USDA.
- Borchert, J.R.
 1950 The climate of the central North American grassland. *Annals of the Association of American Geographers*, vol. XL, no. 1, pp. 1-39.
- Bowman, Peter W.
 1972 Weather in the west central plains and its significance in archeology. *Kansas Anthropological Association Newsletter*, vol. 18, nos. 1-2.
- Capulin Mountain National Monument
 1966- Weather reports. Capulin Mountain National Monument, New Mexico. MS.
 1972
- County Information Service, State of Colorado
 1976 Douglas County, climate. Office of the Director, Cooperative Extension Service, Community Resource Development Project, Colorado State University, Fort Collins, microfiche 493.
- Flora, Snowden D.
 1948 Climate of Kansas. Reports of the Kansas State Board of Agriculture, vol. 67, no. 285. Topeka.
- Fritts, H.
 1965 Tree-ring evidence for climatic changes in western North America. *Monthly Weather Review*, vol. 93, pp. 421-443.
- Gittings, Edwin
 1941 Climate of Colorado. In *Climate and Man*, Yearbook of Agriculture, pp. 798-808. Washington.
- Hardy, Earle L.
 1941 New Mexico climatic summary. In *Climate and Man*, Department of Agriculture Yearbook, pp. 1011-1024. Washington, D.C.
- Haurwitz, B. and J. Austin
 1944 *Climatology*. McGraw-Hill, New York.
- Jenkins, Merle T.
 1941 Influence of climate and weather on growth of corn. In *Climate and Man*, U.S. Department of Agriculture, Yearbook of Agriculture, 1941, pp. 308-320.
- Kendrew, W.G. and B.W. Currie
 1955 The climate of central Canada. Ottawa.
- National Oceanic and Atmospheric Administration
 1972 Colorado annual summary climatological data 77, no. 13, U.S. Department of Commerce, Environmental Data Service. Asheville, North Carolina: National Climate Center.
 1970- Colorado annual summary of climatological data. Vols. 75-79, no. 13. Asheville, North Carolina: U.S. Department of Commerce, Environmental Data Service, National Climate Center.
 1974
- Orton, Robert B.
 1976 Climate, In Stringer, Billy R.: Soil Survey of Hutchinson County, Texas. U.S. Department of Agriculture, Soil Conservation Service.

- Paddock, Mark W.
1964 The climate and topography of the Boulder region. In *Natural History of the Boulder area*, Hugo G. Rodeck (ed.), University of Colorado Museum Leaflet - number 13, pp. 25-33. Boulder.
- Schulman, E.
1938 Nineteen centuries of rainfall in the southwest. *Bulletin of the American Meteorological Society*, vol. 19, no. 5, pp. 51-55.
- Schulman, E.
1953 Tree-ring evidence for climatic change. In *Climatic Change: Evidence, Causes and Effects*, edited by Harlow Shapley, pp. 209-219. Harvard University Press.
1956 Dendroclimatic changes in semiarid America. University of Arizona Press, Tucson.
- Shapley, H. (editor)
1953 *Climatic change: evidence, causes, and effects*. Cambridge, Harvard University Press.
- Thornthwaite, C. Warren
1931 The climates of North America according to a new classification. *Geographic (?) Review*, vol. 21, pp. 633-655.
1941 *Atlas of climatic types in the United States, 1900-1939*. U.S. Department of Agriculture Miscellaneous Publications, no. 421.
1948 An approach toward a rational classification of climate. *Geographical Review*, vol. 38, pp. 55-94.
- Tuan, Yi-Fu, Cyril E. Everard, Jerold G. Widdison, and Iven Bennet
1973 *The climate of New Mexico*. New Mexico State Planning Office, Santa Fe.
- United States Department of Commerce, Weather Bureau
1955 *Weather bureau climatic summary of the United States, supplement for 1931 through 1952*. Washington, D.C.
1965 *Climatic summary of the United States: New Mexico, supplement for 1951-1960*.
1965 *Climatography of the United States no. 60, Climates of the United States*. Washington, D.C.
1953-1966 *Climatological data for the U.S. by section. New Mexico section*. Washington, D.C.
- U.S. Department of Commerce
1907-1974 *Climatological data, Colorado*. Washington, D.C.
- Von Eachen, G.F.
1961 *The climate of New Mexico*. Business Information Series, no. 37. University of New Mexico, Albuquerque.
- Wernstedt, Frederick L.
1972 *World climatic data*. Climatic Data Press.
- Will, G.F.
1950 Dendrochronology, climate, and prehistory on the upper Missouri. *Proceedings of the Sixth Plains Archeological Conference (1948)*. Anthropological Papers no. 11, pp. 95-97. Dept. of Anthropology, University of Utah.

MODERN FLORA

- Aikman, J.M.
1935 Native vegetation of the region. In *Possibilities of Shelterbelt Planting in the Plains Region*. U.S. Forest Service, pp. 155-174.
- Arp, J.
1972 Checklist of the flora from Folsom, New Mexico. University of Colorado Museum, Boulder, MS.
- Ashton, Ruth
1933 *Plants of the Rocky Mountain National Park*. Washington, Government Printing Office.
- Barnes, C.P.
1948 Environment of natural grassland. In *Grass: the yearbook of agriculture, 1948*, edited by Alfred Stefferud, Dept. of Agriculture.
- Bruner, W.E.
1931 The vegetation of Oklahoma. *Ecological Monographs* 1, no. 2, pp. 101-186.
- Castetter, Edward
1955 Vegetation in New Mexico. In *New Mexico Quarterly*, vol. 26.

- Costello, David F.
1954 Manual of the plants of Colorado, edited by H.D. Harrington, Denver.
- Coulter, John and Aven Nelson
1909 New manual of botany of the central Rocky Mountains. The American Book Co., New York.
- Craighead, John J., Frank C. Craighead, Jr. and Ray J. Davis
1963 A Field Guide to Rocky Mountain Wild Flowers. Houghton Mifflin Co., Boston.
- Daubenmire, R.F.
1943 Vegetational zonation in the Rocky Mountains. Botanical Review, vol. 9, pp. 325-393.
- Dodge, Natt N.
1963 100 desert wildflowers. Popular series no. 10, Southwestern Monuments Association. W.A. Krueger Co., Phoenix.
- Elmore, F.H.
1976 Shrubs and trees of the southwest uplands. Southwest Parks and Monuments Association, Globe, Arizona.
- Fowells, H.A. (compiler)
1965 Silvics of forest trees of the United States. Agriculture Handbook number 271, United States Department of Agriculture, Forest Service, Washington.
- Gates, F.C.
1937 Grasses in Kansas. Reports of the Kansas State Board of Agriculture, vol. 55, no. 220-A, pp. 1-349.
1940 Flora of Kansas. Kansas State Collections, Contr. Department of Botany, no. 391.
- Gleason, H.A.
1922 The vegetational history of the middle west. Annals of the Association of American Geographers, vol. 12, pp. 39-85.
- Harrington, Harold David
1954 Manual of the plants of Colorado. Sage Books, Denver.
1967 Edible native plants of the Rocky Mountains. University of New Mexico Press, Albuquerque. 392 pp.
- Hitchcock, A.S.
1950 Manual of the grasses of the United States. 2nd edition revised by Agnes Chase. Department of Agriculture, Washington, D.C. Miscellaneous publication no. 200, U.S. Government Printing Office.
- Inglis, J.M.
1964 A history of vegetation on the Rio Grande plain. Bulletin, Texas Parks and Wildlife, no. 45. Austin.
- Jones, C.B.
1967 Checklist of the flora of Capulin Mountain National Monument, New Mexico. Capulin Mountain National Monument, New Mexico. MS.
- Kansas State Board of Agriculture
1929 Corn in Kansas. Report of the Kansas State Board of Agriculture, vol. 48, no. 191. Topeka.
- Kellogg, Royal S.
1905 Forest belts of western Kansas and Nebraska. U.S. Department of Agriculture, Forest Service, Bulletin 66.
- Kirk, D.R.
1970 Wild edible plants of the western United States. Naturegraph, Healdsburg.
- Kuchler, A.W.
1964 The potential natural vegetation of the conterminous United States. American Geographical Society, Special Research Publication 36.
1967 Vegetational mapping. The Ronald Press, New York.
1974 A new vegetation map for Kansas. Ecology, vol. 55, no. 3, pp. 586-604 and supplement.
- Little, Elbert L., Jr.
1950 Southwestern trees: a guide to the native species of New Mexico and Arizona. United States Department of Agriculture Handbook no. 9.
- McKean, William T. (ed.)
1956 Winter guide to native shrubs of the central Rocky Mountains, with summer key. State of Colorado, Department of Game and Fish, Denver, Colorado.
- Maberry, J.O.
1973 Vegetation map of the Parker Quad., Arapahoe and Douglas counties, Colorado. USGS Map 1-770-N.

- Marr, J.W.
1964 Vegetational distribution. In: Natural History of the Boulder area. University of Colorado Museum, Leaflet no. 13.
- Nelson, Ruth Ashton
1969 Handbook of Rocky Mountain plants. Tucson, Arizona: Dale Stuart King Publications.
- Plant Information Network (PIN)
1978 Plants of Adams County, Colorado. Unpublished data. Department of Botany and Plant Pathology, Colorado State University, Fort Collins.
- Plant Information Network (PIN)
1978 Plants of Huerfano County, Colorado. Unpublished data. Department of Botany and Plant Pathology, Colorado State University, Fort Collins.
1978 Plants of Jackson County, Colorado. Unpublished data. Department of Botany and Plant Pathology, Colorado State University.
1978 Plants of Weld County, Colorado. Unpublished data. Department of Botany and Plant Pathology, Colorado State University, Fort Collins.
- Pool, R.J.
1919 Handbook of Nebraska trees. The Botanical Survey of Nebraska, new series, 3, Lincoln.
- Porter, C.L.
1962 Vegetation zones of Wyoming. University of Wyoming Publications, vol. 27, no. 2, pp. 6-12. Laramie, Wyoming.
- Potter, L.D. and J. Rowley
1960 Pollen rain and vegetation, San Augustin Plains, New Mexico. The Botanical Gazette, vol. 122, pp. 1-25.
- Ramaley, Francis
1909 Wild flowers and trees of Colorado. A.A. Greenman.
1927 Colorado plant life. University of Colorado.
- R.A.P.I.C.
n.d. Rapid Access Plant Information Center. Department of Botany, Colorado State University, Fort Collins, Colorado.
- Rogers, C.M.
1953 The vegetation of the Mesa de Maya region of Colorado, New Mexico and Oklahoma. Lloydia, vol. 16, pp. 257-290.
1954 Some botanical studies in the Black Mesa region of Oklahoma. Rhodora, vol. 56, pp. 205-212.
- Rydberg, P.A.
1922 Flora of the Rocky Mountains and adjacent plains (2nd ed.). Published by the author.
- Sargent, Charles Sprague
1926 Manual of the trees of North America, exclusive of Mexico. Houghton Mifflin Co., Boston and New York.
- Scott, C.A.
1938 Kansas trees and their uses. Reports of the Kansas State Board of Agriculture, vol. 47, no. 186-A, pt. 1, pp. 15-147.
- Sears, P.B.
1961 A pollen profile from the grassland province. Science, vol. 134, pp. 2038-2040.
- Shantz, H.L.
1923 The natural vegetation of the Great Plains region. Annals of the Association of American Geographers, vol. 13, pp. 67-80.
- Shantz, H.L. and R. Zon
1924 The natural vegetation of the United States. Atlas of American Agriculture, pt. 1, the physical basis; natural vegetation. U.S. Department of Agriculture, Bureau of Agricultural Economics.
- Sweet, Muriel
1962 Common edible and useful plants of the west. Naturegraph Company, Healdsburg, Calif.
- Thornton, B.J., H.D. Harrington and R.L. Zimdahl
1974 Weeds of Colorado. Bulletin 514-S revised, experiment station, Colorado State University, Fort Collins, Colorado.
- U.S. Department of Agriculture-Soil Conservation Service
1966a Pinyon-juniper. Technical Guide, section IIF.
1966b Ponderosa pine. Technical Guide, section IIF.

- U.S. Department of Agriculture-Soil Conservation Service
1976 Douglas-fir. Technical Guide, section IIE.
- Ward, R.T., W. Slauson and R.L. Dix
1974 The natural vegetation in the landscape of the Colorado oil shale region. In Surface rehabilitation of land disturbances resulting from oil shale development (C.W. Cook, coordinator): Fort Collins, Colorado State University Environmental Resources Center, Technical Report Series no. 1, pp. 30-66.
- Weaver, J.E. and F.W. Albertson
1956 Grasslands of the Great Plains: their nature and use. Johnson Publishing Co., Lincoln.
- Weaver, J.E.
1965 Native vegetation of Nebraska. University of Nebraska Press, Lincoln.
1968 Prairie plants and their environment: a fifty-year study in the mid-west. Lincoln, University of Nebraska Press.
- Weber, William A.
1972 Rocky Mountain flora. Boulder: Colorado Associated University Press.
- Wells, P.V.
1970 Historical factors controlling vegetation patterns and floristic distributions in the central plains region of North America. In: Pleistocene and Recent Environments of the Central Great Plains, eds. W. Dort, Jr., and J.D. Jones, Jr., pp. 211-224. Department of Geology, University of Kansas Special Publication 3. University of Kansas Press, Lawrence.
1970 Post glacial vegetational history of the Great Plains. Science, vol. 167, pp. 1574-1582.

MODERN FAUNA

- American Ornithologists' Union
1957 Check list of North American birds. American Ornithologists' Union, Baltimore.
- Anthony, H.E.
1928 Field book of North American mammals. New York.
- Armstrong, David M.
1972 Distribution of mammals in Colorado. Monograph of the Museum of Natural History, no. 3. University of Kansas, Lawrence.
- Bailey, A.F. and R.J. Neidrach
1967 Pictorial checklist of Colorado birds. Denver Museum of Natural History, Denver.
- Bailey, Florence
1902 Handbook of birds of the western United States. New York: Houghton, Mifflin and Company.
- Bailey, Vernon
1931 Mammals of New Mexico. Washington, D.C.
1971 Mammals of the southwestern United States. North American Fauna 53. Bureau of Biological Survey, U.S. Dept. of Agriculture.
- Beckman, William C.
1953 Guide to the fishes of Colorado. University of Colorado Museum, Leaflet no. 11.
- Burt, W.H. and R.P. Grossenheider
1964 A field guide to mammals. Houghton Mifflin Co., Boston.
- Cahalane, Victor H.
1947 Mammals of North America. New York.
- Cary, M.
1911 A biological survey of Colorado. North American Fauna, vol. 33, pp. 1-256.
- Cockerell, Theodore D.A.
1927 Zoology of Colorado. Boulder, University of Colorado.
- Cockrum, E.L.
1952 Mammals of Kansas. University of Kansas Publications of the Museum of Natural History, vol. 7, no. 1, pp. 1-303.
- Cooke, W.W.
1897 The birds of Colorado. State Agricultural College of Colorado Experimental Station Bulletin, no. 37. Technical Series no. 2, Denver, CO.
- Dary, David
1973 The buffalo in Kansas. The Kansas Historical Quarterly, vol. 39, no. 3, pp. 305-344.

- Degenhardt, W.G. and J.L. Christiansen
1974 Distribution and habits of turtles in New Mexico. *Southwestern Naturalist*, vol. 19, pp. 21-46.
- Duck, Lester and H.L. Fletcher
1945 A summary of game and furbearing animals in Oklahoma. Pittman-Robertson Series 11, State Bulletin 3: 1-140. Ponca City, Oklahoma.
- Ellis, M. and H.J. Ellis
1913 The amphibia and reptilia of Colorado. University of Colorado.
- Findley, J.S., A.H. Harris, D.E. Wilson, and C. Jones
1975 Mammals of New Mexico. University of New Mexico Press, Albuquerque.
- Finley, R.B.
1959 The woodrats of Colorado: distribution and ecology. *Museum of Natural History*, vol. 10, pp. 213-552. Lawrence, Kansas: University of Kansas.
- Garretson, M.S.
1938 The American bison. New York.
- Gilbert, P.F., O.C. Wallmo, and R.B. Gill
1970 Effect of snow depth on mule deer in Middle Park, Colorado. *Journal of Wildlife Management*, vol. 34, no. 1, pp. 15-23.
- Grinnell, George Bird
1904 The bison. In *Musk-ox, bison, sheep, and goat*, edited by Caspar Whitney, New York.
- Guthrie, Mark R.
1979 Mammal, bird, amphibian, and reptile bone from the Torres Cave site (5 LA 1310), southeastern Colorado. *Southwestern Lore*, vol. 45, nos. 1-2, pp. 36-42.
- Hall, E.R., and R.R. Kelson
1959 The mammals of North America. Ronald Press, New York.
- Henderson, J.
1924 Mollusca of Colorado, Utah, Montana, Idaho, and Wyoming. *University of Colorado Studies*, vol. 13, pp. 65-223.
- Jones, C.B.
1968 Checklist of birds of Capulin Mountain National Monument, New Mexico. Capulin Mountain National Monument, New Mexico. MS.
1970a Checklist of the mammals of Capulin Mountain National Monument, Capulin Mountain National Monument, New Mexico. MS.
1970b Checklist of snakes, lizards, and amphibians of Capulin Mountain National Monument, Capulin Mountain National Monument, New Mexico. MS.
- Kingery, H. and W.D. Gaul (eds.)
1978 Colorado bird distribution latilong study. Colorado Division of Wildlife.
- Kortright, Francis H.
1953 The ducks, geese and swans of North America. The Stackpole Co., Harrisburg, Pennsylvania.
- Lechleitner, R.R.
1969 Wild mammals of Colorado. Pruett Publishing Co., Boulder.
- Lewis, Robert B.
1952 A faunistic study of mammal distribution in Colorado. Master's thesis, University of Colorado, Boulder.
- Lincoln, Frederick C.
1952 Migration of birds. Doubleday & Company, Inc. Garden City, New York.
- Mecham, J.S., M.J. Littlejohn, R.S. Oldham, L.E. Brown, and J.R. Brown
1973 A new species of leopard frog (*Rana pipiens* complex) from the plains of the central United States. *Texas Tech University Museum Occasional Papers* 18.
- Merriam-Bailey, F.A.
1928 Birds of New Mexico. New Mexico Department of Game and Fish, Santa Fe.
- Peterson, Roger T.
1961 A field guide to western birds. Second edition. Houghton Mifflin Company, Boston.
1963 A field guide to the birds of Texas and adjacent states. Houghton Mifflin Co., Boston.
- Pilsby, H.A.
1948 Land mollusca of North America (north of Mexico). *Philadelphia Academy of Natural Sciences Monograph*, vol. 3, no. 2, pp. 521-1113.

- Quick, Horace
 1964 Survey of the mammals. In: Natural History of the Boulder Area, Hugo G. Rodeck, ed. University of Colorado Museum, Boulder, Leaflet 13, pp. 81-89.
- Raun, G.G. and F.R. Gehl
 1972 Amphibians and reptiles in Texas. Dallas Museum of Natural History Bulletin 2.
- Rodeck, Hugh G.
 1967 Guide to the mammals of Colorado. University of Colorado Museum, Boulder.
- Roe, F.G.
 1951 The North American buffalo, a critical study of the species in its wild state. University of Toronto Press.
- Schmidt, K.P. and D.D. Davis
 1941 Field book of snakes of the United States and Canada. G.P. Putnam's Sons, New York.
- Scott, William
 1937 A history of land mammals in the western hemisphere. The Macmillan Co., New York.
- Smith, Baxter L.
 1935 The zoology of Rocky Mountain National Park. U.S. Department of the Interior, National Park Service, Field Division of Education. Berkeley.
- Smith, H.M.
 1946 Handbook of lizards. Comstock Publishing Co., Ithaca.
- Snow, F.H.
 1872 Catalogue of the birds of Kansas. Transactions of the Kansas Academy of Science, vol. 1, pp. 21-29.
- Stebbins, Robert C.
 1954 Amphibians and reptiles of western North America. New York: McGraw-Hill Book Company.
- Warren, Edward R.
 1910 Mammals of Colorado. Knickerbocker Press, N.Y.
 1942 The mammals of Colorado, their habits and distribution (2nd ed.). University of Oklahoma Press, Norman.

GEOLOGY AND GEOGRAPHY OF COLORADO

- Bailey, R.W.
 1935 Epicycles of erosion in the valleys of the Colorado plateau. Journal of Geology, vol. 43, no. 4, pp. 337-355. Chicago.
- Behrendt, John C., Peter Popenoe, and Robert E. Mattick
 1969 A geophysical study of North Park and the surrounding ranges, Colorado. Geological Society of America Bulletin, vol. 80, no. 8, pp. 1523-1537.
- Benedict, James
 1967 Recent glacial history of an alpine area in the Colorado front range, U.S.A. I. Establishing a lichen-growth curve. Journal of Glaciology, vol. 7, pp. 77-87.
 1968 Recent glacial history of an alpine area in the Colorado front range, U.S.A. II. Dating the glacial deposits. Journal of Glaciology, vol. 7, pp. 77-87.
 1970 Frost cracking in the Colorado front range. Geografiska Annaler, 52A, no. 2, pp. 87-93.
 1976 Frost creep and gelifluction features: a review. Quaternary Research, vol. 6, pp. 55-76.
 in - Fossil ice-wedge polygons in the Colorado front range: origin and significance. Geological Society of America Bulletin.
 press
- Boettcher, Arnold J.
 1964 Geology and ground-water resources in eastern Cheyenne and Kiowa counties, Colorado. U.S. Geological Survey Water-Supply Paper 1779-N.
- Brooks, L.R., J.F. Duds, Depue Falck, et al.
 1933 Land classification of western Colorado. U.S. Dept. of the Interior Geological Survey.
- Coash, John Russell
 1949 Sedimentary study of the Pennsylvanian-Permian section in the Howard-Wellsville area, Fremont County, Colorado. Unpublished M.A. Thesis. University of Colorado, Boulder.
- Coffin, Donald L.
 1967 Geology and ground-water resources of the Big Sandy Creek valley, Lincoln, Cheyenne, and Kiowa counties, Colorado. U.S. Geological Survey Water-Supply Paper 1843.

- Curtis, Bruce F.
1960 Major geologic features of Colorado. In Guide to the Geology of Colorado, R.J. Weimer and J.D. Haun, eds. Denver: The Rocky Mountain Association of Geologists.
- Dahlem, D.H.
1966 Geology of the Lookout Mountain area. Dissertation Abstracts, vol. 26, no. 11, p. 6758.
- Duce, Jason T.
1924 Geology of Las Animas, Otero and Bent counties, Colorado. Colorado Geological Survey Bulletin, vol. 27, pp. 74-102.
- Duchrow, Linda L.
1974 Geologic history of Colorado. Typescript, University of Colorado at Denver.
- Emmons, Samuel Franklin, Whiteman Cross and George Homans
1896 Geology of the Denver basin in Colorado. U.S. Government Printing Office, Washington. Monographs of the U.S.G.S., vol. 27.
- Fahey, B.D.
1973 An analysis of diurnal freeze-thaw and frost heave cycles in the Indian Peaks region of the Colorado front range. Arctic and Alpine Research, vol. 5, no. 3, pt. 1, pp. 269-281.
- Fahey, B.D.
1975 Nonsorted circle development in a Colorado alpine location. Geografiska Annaler, 57A, nos. 3-4, pp. 153-164.
- Galbraeth, Edwin C.
1953 A contribution to the Tertiary geology and paleontology of northeastern Colorado. University of Kansas (Topeka) Paleontological Contributions, Vertebrata, article 13.
- Gardner, Maxwell E.
1967 Quaternary and engineering geology of the Orchard, Weldona, and Fort Morgan quadrangles, Morgan County, Colorado. Doctoral dissertation, Colorado School of Mines, Golden.
- Gerhard, Lee C.
1967 Paleozoic geologic development of the Canon City embayment. American Association of Petroleum Geologists Bulletin, vol. 51, no. 11, pp. 2260-2280.
- Gilbert, G.K.
1896 The underground water of the Arkansas valley in eastern Colorado. U.S. Geological Survey, 17th Annual Report, pt. 2, pp. 557-601. Washington.
- Grose, L. Trowbridge
1960 Geologic formations and structure of Colorado Springs area, Colorado. In: Guide to the Geology of Colorado, R.J. Weimer and J.D. Haun, eds. Denver: The Rocky Mountain Association of Geologists. pp. 188-195.
- Grose, L.T. and Robert M. Hutchinson
1960 Leadville to Trout Creek. Tectonics and economic geology of central Colorado. In: Guide to the Geology of Colorado, Weimer and Haun, eds. Denver: The Rocky Mountain Association of Geologists, pp. 155-156.
- Grose, L.T.
1972 Geologic formations and structure of the Colorado Springs area, Colorado. In: Energy and Mineral Resources of the Southern Rocky Mountains, Mt. Geol., vol. 9, pp. 229-237.
- Hail, William J., Jr.
1965 Geology of northwestern North Park, Colorado. Geological Survey Bulletin, no. 1188, p. 133.
- Henderson, Junius
1910 Extinct and existing glaciers in Colorado. University of Colorado.
- Hill, D.R., and J.M. Tompkin
1953 General and engineering geology of the Wray area, Colorado and Nebraska. U.S. Geological Survey, Bulletin 1001.
- Hunt, C.B. and V.P. Sokoloff
1950 Pre-Wisconsin soil in the Rocky Mountain region, a progress report. U.S. Geological Survey, Professional Paper 221-G, pp. 109-123.
- Hunt, Charles B.
1953 Pleistocene-Recent boundary in the Rocky Mountain region. Geological Survey Bulletin 996-A, U.S. Government Printing Office, Washington, D.C.
- Ives, R.L.
1953 Later Pleistocene glaciation in the Silver Lake valley, Colorado. Geographical Review, vol. 43, pp. 229-252.

- Johnson, D.L. and K.L. Hansen
1974 The effects of frost-heaving on objects in soils. *Plains Anthropologist*, vol. 19, no. 64, pp. 81-98.
- Johnson, D.L., D.R. Muhs, and M.L. Barnhardt
1977 The effects of frost-heaving on objects in soils, II: laboratory experiments. *Plains Anthropologist*, vol. 22, no. 76, pt. 1, pp. 133-147.
- Johnson, Ross B.
1967 The great sand dunes of southern Colorado. U.S. Geological Survey Professional Paper 575-C: C-177 to C-183.
- Knight, S.H.
1964 The geologic background of the Boulder area. In *Natural story of the Boulder Area*, Hugo Rodeck, ed. University of Colorado Museum, Boulder. Leaflet 13, pp. 1-8.
- Lee, W.T.
1917 Geology of Raton Mesa and other regions in Colorado and New Mexico. United States Geological Survey Professional Paper 101, pp. 1-221.
- Levings, W.S.
1951 Erosional history of the Raton Mesa region. *Colorado School of Mines Quarterly*, vol. 46, pp. 3.
- Lindvall, Robert M.
1976 Preliminary geologic map of the Fort Logan quadrangle, Jefferson, Denver, and Arapahoe counties, Colorado. U.S.G.S. Miscellaneous Field Studies Map, MF-831, Fort Logan, Quad., Colorado.
- Lipman, P.W., T.A. Stevens, R.G. Luedke and W.S. Burbank
1973 Revised volcanic history of the San Juan, Uncompahgre, Silverton and Lake City calderas in the western San Juan mountains, Colorado. *United States Geological Survey Journal of Research*, vol. 1, no. 6, pp. 627-642.
- Lovering, T.S.
1929 Geologic history of the front range, Colorado. *Colorado Scientific Society Proceedings*, vol. 12, no. 4, pp. 59-111.
- Maberry, J.O.
1972 Geologic map of the Parker quad., Arapahoe and Douglas counties, Colo. U.S.G.S. Map 1-770-A.
- Mallory, William W.
1972 Geologic atlas of the Rocky Mountain region. Denver: Rocky Mountain Association of Petroleum Geologists.
- McGinnes, C.J. (ed.)
1956 A brief description of the physiography of the Raton basin, Colorado: In *Guidebook to the Geology of the Raton Basin, Colorado*, pp.10-13. Rocky Mountain Association of Geologists, Denver.
- McLaughlin, Thad G.
1946 Geology and ground-water resources of parts of Lincoln, Elbert, and El Paso counties, Colorado. Colorado Water Conservation Board, Ground Water Series, Bulletin 1.
1955 Geology and ground water resources of Baca County, Colorado. United States Geological Survey Water Supply Paper, 1256. Middleton, M.D.
1974 A comparison of the sedimentary framework of the Denver and Dawson formations of the Colorado front range. Unpublished MS.
- Moore, Fred E.
1960 Guide to the geology of Colorado. In *The Rocky Mountain Association of Geologists*, pp. 217-222. Denver.
- Oborne, H.W. and W.A. Fischer
1960 Stratigraphy of Colorado Springs-Canon City area. In: *Guide to the Geology of Colorado*. R.J. Weimer and J.D. Haun, eds. Denver: The Rocky Mountain Association of Geologists, pp. 252-256.
- Richardson, G.B.
1915 Geology of the Castle Rock quadrangle. United States Geological Survey, Paper no. 198.
- Richmond, Gerald M.
1960 Glaciation of the east slope of Rocky Mountain National Park, Colorado. *Bulletin of the Geological Society of America*, vol. 71, pp. 1371-1382.
1965 Glaciation of the Rocky Mountains. In *The Quaternary of the United States* (H.E. Wright, Jr., and D.G. Frey, eds.) Princeton Univ. Press, Princeton, New Jersey, pp. 217-230.

- Rocky Mountain Association of Geologists
1972 Geologic atlas of the Rocky Mountain region, United States of America. A. B. Hirschfeld Press, Denver.
- Rold, John Wesley
1950 The structure and pre-Pennsylvanian stratigraphy of the Wellsville area, Colorado. 1948. Unpublished M.A. thesis. University of Colorado, Boulder.
- Salotti, Charles A.
1961 Geology and petrology of the Cotopaxi-Howard area. Dissertation Abstracts, vol. 21, no. 12, pp. 3805.
- Scott, Glenn
1960 Subdivision of the Quaternary alluvium of the front range near Denver, Colorado. Geological Society of America Bulletin, vol. 71.
- Scott, Glenn
1962 Geology of the Littleton quadrangle, Jefferson, Douglas, and Arapahoe counties, Colorado. U.S. Geological Survey Bulletin 1121-L.
1965 Nonglacial Quaternary geology of the southern and middle Rocky Mountains. In The Quaternary of the United States, edited by H.E. Wright, Jr., and David G. Grey. Princeton, New Jersey: Princeton University Press.
1965 Quaternary sequence east of the front range near Denver, Colorado. In: Guidebook for one-day field conferences: Boulder area, Colorado. VIIth Congress, International Association for Quaternary Research.
1968 Geologic and structure contour map of the La Junta quadrangle, Colorado and Kansas. United States Geological Survey Map I-560.
1969 General and engineering geology of the northern part of Pueblo, Colorado. Geological Survey Bulletin 1262. United States Government Printing Office, Washington, D.C.
1975 Cenozoic surfaces and deposits in the southern Rocky Mountains. In Bruce Curtis, ed., Cenozoic History of the Southern Rocky Mountains. Geological Society of America Memoir 144, pp. 227-248.
1960 Quaternary sequence east of the front range near Denver, Colorado. In Guide to the Geology of Colorado. Geological Society of America, Rocky Mountain Association of Geologists, and Colorado Scientific Society, pp. 206-212.
- Scott, G.R. and Wobus, R.A.
1973 Reconnaissance geologic map of Colorado Springs and vicinity, Colorado. U.S.G.S. map MF-482.
- Stegner, Wallace (editor)
1962 U.S. geographical and geological survey of the Rocky Mountain region. Cambridge, Mass.: Harvard University Press.
- Steven, T.A., et al
1972 Upper Cretaceous and Cenozoic igneous rocks. In: Geologic Atlas of the Rocky Mountain region. Rocky Mountain Association of Geologists, pp. 229-232.
- Stockton, Charles W.
1965 Hydrogeology of the upper Boxelder valley, Larimer County, Colorado. Unpublished Master's thesis, Colorado State University.
- Stone, G.W. (editor)
1935 Geologic map of Colorado. Prepared by the United States Geologic Survey in cooperation with Colorado State Geological Survey Board and Colorado Metal Mining Fund. Compiled by W.S. Burbank, T.S. Lovering, E.N. Goddard, and E.B. Eckel. Williams and Heintz Map Corporation, Washington, D.C.
- Tweto, Ogden and J.E. Chase
1972 Gravity and magnetic features as related to geology in the Leadville 30 minute quadrangle, Colorado. Geological Survey Professional Paper 726-C. Washington, D.C.: U.S. Government Printing Office.
- U.S. Geological Survey
1935 Geologic map of Colorado. Reprinted 1959.
- U.S. Department of the Interior, Geological Survey
1976 Mountains and plains, Denver's geologic settings. U. S. Government Printing Office, 1976 - 211 - 345/71.
- Van Diest, P.H.
1890 Report on the geological conditions of Artesian basins in eastern Colorado and New Mexico. U.S. 51st Congress, 1st session, Senate Executive Document 222, pp. 87-97. Washington.

- Van Horn, Richard
 1957 Bedrock geology of the Golden quadrangle, Colorado. Map U.S.G.S.
- Wahlstrom, E.E.
 1947 Cenozoic physiographic history of the front range, Colorado. Bulletin of the Geological Society of America, vol. 59.

GEOLOGY AND GEOGRAPHY OF KANSAS

- Adams, George I.
 1902 Physiographic divisions of Kansas. Bulletin of the American Geographical Society, vol. 34, no. 2, pp. 89-104.
- Bradley, Edward, and Carlton R. Johnson
 1957 Ground-water resources of the Ladder Creek area in Kansas. State Geological Survey of Kansas, Bulletin 126.
- Bureau of Reclamation
 1949 The geography of Kansas. Transactions of the Kansas Academy of Science, vol. 52, no. 3, September.
- Frye, J.C.
 1951 Soil-forming intervals evidenced in the Kansas Pleistocene. Soil Science, vol. 71, no. 6, pp. 403-408. Baltimore.
- Frye, John C. and A.B. Leonard
 1949 Geology and ground-water resources of Norton County and northwestern Phillips County, Kansas. The University of Kansas, State Geological Survey of Kansas, Bulletin 81.
 1952 Pleistocene geology of Kansas. State Geological Survey of Kansas, Bulletin 99. Lawrence.
- Haworth, Erasmus
 1897 Physiography of western Kansas. Kansas University Geological Survey, vol. 2, pp. 11-49.
- Hibbard, C.W.
 1955 The Jinglebob interglacial (Sangamon?) fauna from Kansas and its climatic significance. University of Michigan, Contributions to the Museum of Paleontology, vol. 12, pp. 179-288.
- Lohman, S.W. and J. Frye
 1940 Geology and groundwater resources of the "Equus Beds" area in southcentral Kansas. Economic Geology, vol. 35.
- Schoewe, Walter H.
 1949 The geography of Kansas. Transactions of the Kansas Academy of Science, vol. 52, no. 3, Lawrence.
 1949 The geography of Kansas, pt. 2 -physical geography. Transactions of the Kansas Academy of Science, vol. 52, no. 3, pp. 261-333.
 1951 The geography of Kansas, pt. 3 -hydrogeography. Transactions of the Kansas Academy of Science, vol. 54, no. 3, pp. 263-329.
- Smith, H.T.U.
 1940 Geologic studies in southwestern Kansas. Kansas Geological Survey, Bulletin 34.
- Williston, S.W.
 1897 The Pleistocene of Kansas. University Geological Survey of Kansas, vol. 2, pp. 299-308. Topeka.
 1898 The Pleistocene of Kansas. Transactions of the Kansas Academy of Science, vol. 15, pp. 90-94.

GEOLOGY AND GEOGRAPHY OF NEBRASKA

- Adams, George I.
 1902 Geology and water resources of the Patrick and Goshen Hole quadrangles in eastern Wyoming and western Nebraska. U.S. Geological Survey, Water-Supply and Irrigation Papers, no. 70. Washington.
- Aughey, Samuel
 1876 The superficial deposits of Nebraska. Annual Report of the United States Geological and Geographical Survey of the Territories embracing Colorado and parts of adjacent territories, pp. 241-269.
 1880 Sketches of the physical geography and geology of Nebraska. Omaha. 326 pp.

- Burchett, Raymond Richard
1970 Guidebook to the geology along the Missouri River bluffs of southeastern Nebraska and adjacent areas. Lincoln: Nebraska Geological Surveys.
- Condra, E.C.
1906 Geography of Nebraska. Lincoln.
- Condra, George Evert
1911 Geography of Nebraska. University Publishing Company. Lincoln.
- Condra, George E., E.C. Reed and E.D. Gordon
1947 Correlation of the Pleistocene deposits of Nebraska. Nebraska Geological Survey Bulletin, series 2, no. 15.
- Darton, N.H.
1899 Preliminary report on the geology and water resources of Nebraska west of the 103rd meridian. U.S. Geological Survey, 19th Annual Report, pt. 4, pp. 719-785.
- Keech, C.F. and Ray Bentall
1971 Dunes on the plains-the sand hills region of Nebraska. Conservation and Survey Division, the University of Nebraska, Lincoln.
- Lueninghoener, Gilbert
1934 A lithologic study of some typical exposures of the Ogallala Formation in western Nebraska. (M.S. Thesis), University of Nebraska Library, Department of Geology, University of Nebraska, 7-191934.
1947 The post-Kansan geologic history of the lower Platte valley area. University of Nebraska Studies, n.s., no. 2.
- Lueninghoener, G.C., C.B. Schultz, and W.D. Frankforter
1950 The Pleistocene terraces of the central Great Plains. Proceedings of the Sixth Plains Archeological Conference (1948). Anthropological Papers, no. 11, p. 60. Dept. of Anthropology, University of Utah.
- Lugn, A.L.
1934 Outline of Pleistocene geology of Nebraska. Nebraska State Museum, vol. 1, bulletin 41, part I.
1935 The Pleistocene geology of Nebraska. Nebraska Geological Survey, Bulletin no. 10.
1939 Nebraska in relation to the problems of Pleistocene stratigraphy. American Journal of Science, vol. 237, pp. 851-884.
- MacClintock, P., E.H. Barbour and A.L. Lugn
1936 A Pleistocene lake in the White River valley. The American Naturalist, vol. 70, no. 729, pp. 346-360.
- Reed, E.C.
1950 Wind erosion, loess deposits and ground water. Proceedings of the Sixth Plains Archeological Conference (1948). Anthropological Papers, no. 11, pp. 64-66. Dept. of Anthropology, University of Utah.
1969 Groundwater map of Nebraska. Nebraska Geological Survey.
- Reed, E.C. and V.H. Dreeszen
1965 Revision of the classification of the Pleistocene deposits of Nebraska. Bulletin of the Nebraska Geological Survey, vol. 23, pp. 165.
- Reed, E.C., V.H. Dreeszen, C.K. Bayne, and C.B. Schultz
1965 The Pleistocene in Nebraska and Kansas. In The Quaternary of the United States (H.E. Wright, Jr., and D.G. Frey, eds.), Princeton Univ. Press, Princeton, New Jersey, pp. 187-202.
- Schreurs, R.L.
1956 Geology and ground water resources of Buffalo County and adjacent areas, Nebraska. Geological Survey Water Supply Paper 1358. United States Printing Office, Washington.
- Schultz, C. Bertrand, Gilbert C. Lueninghoener, and W.D. Frankforter
1948 Preliminary geomorphological studies of the Lime Creek area. Bulletin of the University of Nebraska State Museum, vol. 3, pp. 31-42.
1951 A graphic resume of the Pleistocene of Nebraska (with notes on the fossil mammalian remains). Bulletin of the University of Nebraska State Museum, vol. 3, no. 6.
- Schultz, C. Bertrand and Thompson M. Stout
1945 Pleistocene loess deposits of Nebraska. American Journal of Science, vol. 242, pp. 231-244.

Smith, H.T.U.

- 1965 Dune morphology and chronology in central and western Nebraska. *Journal of Geology*, vol. 73, pp. 557-577.

GEOLOGY AND GEOGRAPHY OF NEW MEXICO

Baldwin, B. and W.R. Muehlberger

- 1959 Geologic studies of Union County, New Mexico. State Bureau of Mines and Mineral Resources, Bulletin 63. New Mexico Institute of Mining and Technology, Socorro.

Baltz, E.H. and G.O. Bachman

- 1956 Notes on the geology of the southeastern Sangre de Cristos mountains. In: *New Mexico Geological Society, 7th Field Conference Guidebook*, pp. 96-108.

Bryan, Kirk and Franklin T. McCann

- 1943 Sand dunes and alluvium near Grants, New Mexico. *American Antiquity*, vol. 8, no. 3, pp. 281-295.

Darton, N.H.

- 1928 Geologic map of New Mexico. U.S. Geological Survey. Washington,

D.C. Denny, C.S.

- 1940 Tertiary geology of the San Acacia area, New Mexico. *Journal of Geology*, vol. 48, no. 1, pp. 73-106.

Dinwiddie, G.A. and J.B. Cooper

- 1966 Water-bearing characteristics of the rocks of eastern Colfax and western Union counties, New Mexico: In *New Mexico Geological Society, Guidebook of Taos-Raton-Spanish Peaks country, New Mexico and Colorado*, eds. S.A. Northrop and C.B. Read, pp. 76-79. Seventeenth Field Conference, New Mexico Geological Society.

Dorroh, J.H., Jr.

- 1946 Certain hydrologic and climatic characteristics of the southwest. University of New Mexico, Publications in Engineering 1. University of New Mexico Press, Albuquerque.

Fitzsimmons, J.P.

- 1959 The structure and geomorphology of west-central New Mexico. In: *Guidebook of west-central New Mexico*, pp. 112-116. Tenth Field Conference, New Mexico Geological Society, Socorro.

Foreman, F.

- 1956 San Augustin Plains - the sediments. *Science*, vol. 124, pp. 259.

Griggs, R.L. and G.E. Hendrickson

- 1951 Geology and ground-water resources of San Miguel county, New Mexico. Groundwater Report 2, New Mexico Bureau of Mines and Mineral Resources, Socorro.

Gruner, J.W.

- 1920 Geological reconnaissance of the southern part of Taos range, New Mexico. *Journal of Geology*, vol. 28, pp. 731-742.

Hewett, Edgar Lee, Junius Henderson, and W.W. Robbins

- 1913 The physiography of the Rio Grande valley, New Mexico, in relation to Pueblo culture. Bureau of American Ethnology, Bulletin 54. Washington.

Leopold, L.B., W.W. Emmett, and R.M. Myrick

- 1966 Channel and hillslope processes in a semiarid area, New Mexico. Geological Survey Professional Paper, 352-G. Washington.

Lessard, Robert H., and Waldemore Bejnar

- 1976 Geology of the Las Vegas area. In *Guidebook of Vermejo Park*. New Mexico Geological Society, Guidebook 27, pp. 103-108.

Miller, J.P., A. Montgomery, and P.K. Sutherland

- 1963 Geology of part of the southern Sangre de Cristo mountains, New Mexico. New Mexico State Bureau of Mines and Mineral Resources Memoir 11.

Montgomery, A.

- 1953 Pre-Cambrian geology of the Picuris range, north-central New Mexico. New Mexico Institute of Mining and Technology, State Bureau of Mines and Mineral Resources, Bulletin 30.

Muehlberger, W.R., B. Baldwin, and R.W. Foster

- 1965 High plains: northeastern New Mexico. Scenic Trips to the Geologic Past 7. State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro.

- Nichols, R.L.
1934 Quaternary geology of the San Jose valley, New Mexico. Geological Society of America, Proceedings for 1933, p. 453.
- Richmond, G.M.
1962 Correlation of some glacial deposits in New Mexico. United States Geological Survey, Professional Paper 450E, No. 213, pp. E121-E125.
- Robinson, G.D., A.A. Wanek, W.H. Hayes and M.E. McCallum
1964 Philmont country. U. S. Geological Survey, Professional paper 505.
- Sutherland, P.K.
1972 Pennsylvanian stratigraphy, southern Sangre de Cristo mountains, New Mexico. In Geologic Atlas of the Rocky Mountain region, edited by Rocky Mountain Association of Geologists, pp. 139-142. A.B. Hirschfield Press, Denver.
- Tatum, R.M.
1946 Geology of the Trinidad region. Southwestern Lore, Denver.
- Wood, G.H., Jr., S.A. Northrop, and R.L. Griggs
1953 Geology and stratigraphy of Koehler and Mount Laughlin quadrangles and parts of Abbott and Springer quadrangles, eastern Colfax County, New Mexico. United States Geological Survey Oil and Gas Investigations, Map OM 141.

GEOLOGY AND GEOGRAPHY OF OKLAHOMA

- Branson, Carl C.
1966 Patterns of Oklahoma prairie mounds. Oklahoma Geology Notes, vol. 26, no. 11, pp. 263-273.
- Norman, Gould, C.N. et al.
1908 Oklahoma Geological Survey. Bulletin no. 1, Norman.
- Gould, Charles N.
1909 Geography of Oklahoma. Ardmore.
- Schoff, Stuart L.
1939 Geology and ground water resources of Texas County, Oklahoma. Oklahoma Geological Survey, Bulletin 59.
- Snider, L.C.
1917 Geography of Oklahoma. Oklahoma Geological Survey, Bulletin 27.

GEOLOGY AND GEOGRAPHY OF TEXAS

- Albritton, Claude C. and Kirk Bryan
1939 Quaternary stratigraphy in the Davis Mountains, TransPecos, Texas. Bulletin Geological Society of America, vol. 50, pp. 1423-1474.
- Baker, C.L.
1915 Geology and underground waters of the northern Llano Estacado. University of Texas, Bulletin, no. 15.
- Bureau of Economic Geology
1969 Geologic atlas of Texas, Amarillo sheet. The University of Texas at Austin.
- Cummins, William F.
1891 Report on the geology of northwestern Texas. Texas Geological Survey, Annual Report no. 2. Austin.
- Curtis, Neville M., Jr., and William E. Ham
1972 Geomorphic provinces of Oklahoma. Oklahoma Geological Survey, Geology and Earth Resources of Oklahoma. Educational Publication 1, p. 3. Norman.
- Evans, Glen L., and Grayson E. Meade
1945 Quaternary geology of the Texas high plains. The University of Texas Publication, no. 4401, pp. 485-556. Austin.
- Gould, Charles N.
1906 The geology and water resources of the eastern portion of the panhandle of Texas. U.S. Geological Survey, Water-Supply Paper no. 154. Washington, D.C.
1907 The geology and water resources of the western portion of the panhandle of Texas. U.S. Geological Survey Water-Supply and Irrigation Paper no. 191, Washington, D.C.
- Gould, Charles N. and John T. Lonsdale
1926 Geology of Texas County, Oklahoma. Oklahoma Geological Survey Bulletin 37.

- Green, F.E.
n.d. Geology and stratigraphy of the sand hills of the southern high plains. MS.
- Harrington, J.P.
1957 Sinkholes, bottomless lakes, and the Pecos River. *Scientific Monthly*, vol. 84, pp. 302-308.
- Hill, R.T.
1899 Physical geography of the Texas region. U.S. Geological Survey Topographic Folio 3.
- Huffington, R.M. and C.C. Albritton, Jr.
1941 Quaternary sands on the southern high plains of western Texas. *American Journal of Science*, vol. 239, pp. 325-338.
- Hughes, Jack T.
1976 Remarks on the geology of the Canyon Lakes area, report submitted to the Department of Anthropology, Texas Tech University, Lubbock.
- Kennedy, William
1844 Texas; its geography, natural history and topography. New York, 1844.
- Melton, F.A.
1929 Natural mounds of northeastern Texas, southern Arkansas and northern Louisiana. *Oklahoma Academy of Science, Proceedings*, vol. 9, p.90. Norman.
1940 A tentative classification of sand dunes. Its application to dune history in the southern high plains. *Journal of Geology*, vol.48, no. 2, pp. 113-174.
- Oetking, Philip F.
1959 Geological highway map of Texas. Dallas Geological Society, Dallas.
- Patton, Leroy T.
1923 The geology of Pottery County. *The University of Texas Bulletin* 2330. Austin.
- Reed, Lyman C. and Oscar M. Longnecker, Jr.
1932 The geology of Hemphill County, Texas. *The University of Texas Bulletin* 3231. Austin.
- Sellards, E.H., W.S. Adkins, and F.B. Plummer
1933 Geologic map of Texas. Bureau of Economic Geology, Report of Investigations, no. 20. Austin.
- Simonds, Frederic William
1905 The geography of Texas, physical and political. Boston, 1905.

GEOLOGY AND GEOGRAPHY, GENERAL

- Alden, W.C.
1924 Physiographic development of the northern Great Plains. *Bulletin, Geological Society of America*, vol. 35, pp. 385-423.
- Antevs, Ernst
1925 On the Pleistocene history of the Great Basin. *Carnegie Institution of Washington Publication* 352, pp. 53-114. Washington, D.C.
1928 The last glaciation with special reference to the ice retreat in northeastern North America. *American Geographical Society, Research Series* no. 17.
1929 Maps of the Pleistocene glaciations. *Bulletin of the Geological Society of America*, vol. 40, pp. 631-720.
1934 Climaxes of the last glaciation in North America. *American Journal of Science*, vol. 28, series 5, pp. 304-311.
1948 The great basin with emphasis on glacial and post-glacial times: climatic changes and pre-white man. *University of Utah Bulletin*, vol. 38, no. 20, pp. 168-191.
- Antevs, Ernst
1950 Conditions of deposition and erosion by streams in dry regions of the Great Plains. *Proceedings of the Sixth Plains Archeological Conference (1948)*. *Anthropological Papers*, no. 11. Dept. of Anthropology, University of Utah, pp. 42-45.
1950 Reply to Dr. Benjamin H. Burma. *Proceedings of the Sixth Plains Archeological Conference (1948)*. University of Utah, Department of Anthropology, *Anthropological Papers*, no. 11, pp. 56-59.
1952 Arroyo cutting and filling. *Journal of Geology*, vol. 60, no. 4, pp. 375-385.
1952 Cenozoic climates of the Great Basin. *Geologische Rundschau*, Bd. 40, Heft 1, pp. 94-108. Stuttgart.
- Atwood, W.W.
1940 The physiographic provinces of North America. Ginn and Co., pp. 1535. New York.

- Birkeland, P.W. and R.R. Shroba
1974 The status of the concept of Quaternary soil-forming intervals in the western United States. In: *Quaternary Environments: Proceedings of a Symposium*, W.C. Mahaney, ed., York University, Geographical Monographs, no. 5, pp. 241-276.
- Brown, R.W.
1943 The Cretaceous-Tertiary boundary in the Denver basin, Colorado. *G.S.A. Bulletin*, vol. 54, pp. 65-86.
- Bryan, Kirk
1940 Erosion in the valleys of the southwest. *New Mexico Quarterly*, vol. 10, pp. 227-232. Albuquerque.
- Bryan, Kirk and C.C. Albritton
1943 Soil phenomena as evidence of climatic changes. *American Journal of Science*, vol. 241, pp. 469-490.
- Burma, Benjamin H.
1950 Erosion and sedimentation in the Great Plains: a criticism of Dr. Antevs' conference papers. *Proceedings of the Sixth Plains Archeological Conference (1948)*. University of Utah, Department of Anthropology, Anthropological Papers, no. 11, pp. 52-55.
- Corte, A.E.
1963a Vertical migration of particles in front of a moving freezing plane. *U.S. Army, Cold Regions Research and Engineering Laboratory, Research Report 105*, 8 pp.
1963b Particle sorting by repeated freezing and thawing. *Science*, vol. 142, no. 3591, pp. 499-501.
- Darton, N.H.
1905 Preliminary report on the geology and underground water resources of the central Great Plains. *U.S. Geological Survey professional paper 32*. U.S. Government Printing Office, Washington, D.C.
- Denton, G.H., and S.C. Porter
1970 Neoglaciation. *Scientific American*, vol. 222, no. 6, pp. 101-110.
- Dunbar, Carl O.
1949 *Historical geology*. New York, John Wiley and Sons, Inc., pp. 406-417.
- Embleton, Clifford and Cuchlaine A.M. King
1968 *Glacial and periglacial geomorphology*. Edinburgh: R. and R. Clark.
- Epis, Rudy C. and Charles E. Chapin
1975 Geomorphic and tectonic implications of the post-Laramide, late Eocene erosion surface in the southern Rocky Mountains. *Geological Society of America Memoir 144*, pp. 45-74.
- Eschman, Donald F.
1955 Glaciation of the Michigan River basin, North Park, Colorado. *The Journal of Geology*, vol. 63, no. 3, pp. 197-213.
- Fenneman, N.M.
1928 Physiographic divisions of the United States. *Annals of the Association of American Geographers*, vol. 18, no. 4, pp. 261-353.
1931 *Physiography of western United States*. New York, McGrawHill Book Company.
1938 *Physiography of eastern United States*. New York, McGrawHill Book Company.
1946 *Physical divisions of the United States*. U.S. Geological Survey 1:7,000,000 sheet.
- Flint, R.F.
1947 *Glacial geology and the Pleistocene epoch*. New York, 1947.
1953 *The Ice Age in arctic North America*. Annual Report, Smithsonian Institution for 1952, pp. 243-260.
1957 *Glacial and Pleistocene geology*. John Wiley and Sons, Inc., New York.
1957 *Glacial geology of the Pleistocene epoch*. Wiley and Sons. New York.
1971 *Glacial and Quaternary geology*. John Wiley and Sons, Inc., New York.
- Frye, J.C. and H.B. Willman
1960 Classification of the Wisconsin stage in the Lake Michigan glacial lobe. Circular 285, Illinois State Geological Survey, Springfield.
- Frye, J.C., H.B. Willman, M. Rubin, and R.F. Black
1968 Definition of the Wisconsinian stage. *U. S. Geological Survey. Bulletin 1274-E*.
- Gilluly, James, Aaron C. Waters and A.O. Woodford
1968 *Principles of geology*. W.H. Freeman, San Francisco.

- Grose, L. Trowbridge
1972 Tectonics. In: Geologic Atlas of the Rocky Mountain Region. Rocky Mountain Association of Geologists.
- Ham, W.E. and J.L. Wilson
1967 Paleozoic epeirogeny and orogeny in the central United States. *American Journal of Science*, vol. 265, pp. 332-407.
- Hay, R.
1895 Water resources of a portion of the Great Plains. U.S. Geological Survey, 16th Annual Report, pt. 2, pp. 535-588. Washington.
- Hopkins, D.M.
1959 Cenozoic history of the Bering Land Bridge. *Science*, vol. 129, pp. 1519-1528.
- Hunt, Charles B.
1950 Progress in mapping Late Pleistocene and Recent deposits in the Denver area. *Plains Archaeological Conference News Letter*, vol. 3, no. 2, p. 10.
1961 Progress in mapping Late Pleistocene and Recent deposits in the Denver area. *Plains Archaeological Conference News Letter*, vol. III, Reprint, pp. 35-36.
1967 *Physiography of the United States*. San Francisco and London: W.H. Freeman and Co.
- Karlstrom, Thor N.V.
1956 The problem of the cochrane in Late Pleistocene chronology. *Geological Survey Bulletin* 1021-J. U.S. Government Printing Office, Washington, D.C.
- Kay, G.F.
1931 Classification and duration of the Pleistocene period. *Bulletin of the Geological Society of America*, vol. 42, pp. 425-466.
- Kottowski, Frank E., M.E. Cooley, and R.V. Ruhe
1965 Quaternary geology of the southwest. In *The Quaternary of the United States*, edited by H.E. Wright and D.G. Frey, pp. 287-298. Princeton University Press, Princeton.
- Leighton, M.M.
1933 The naming of the subdivisions of the Wisconsin glacial age. *Science*, n.s. vol. 77, p. 168.
1957 The Cary-Mankato-Valders problem. *Journal of Geology*, vol. 65, pp. 108-111.
1960 The classification of the Wisconsin glacial stage of northcentral United States. *The Journal of Geology*, vol. 68, pp. 529-552. University of Chicago Press, Chicago.
- Leverett, Frank, and Frederick W. Sardeson
1932 Quaternary geology of Minnesota and parts of adjacent states. U.S. Geological Survey, Professional Paper 161, pp. 119-146.
- Lobeck, A.K.
1922 Physiographic diagram of the United States. Wisconsin Geographical Press.
1939 *Geomorphology*. New York.
1948 *Physiographic provinces of North America*. The Geographical Press, New Jersey.
1957 *Physiographic diagram of the United States*. The Geographical Press, Maplewood, NJ.
- Long, Clarence Sumner, Jr.
1966 Basal Cretaceous strata, southeastern Colorado. PhD thesis, Department of Geological Sciences. University of Colorado, Boulder.
- MacClintock, Paul
1937 Pleistocene glacial stratigraphy in North America. In *Early Man*, pp. 327-340. Philadelphia.
- Malde, H.E.
1955 Surficial geology of the Louisville quadrangle, Colorado. U.S. Geological Survey, Bulletin 996-E, pp. 217-259.
- Matthes, F.E.
1942 Report of committee on glaciers, 1941-1942. *Transactions of the American Geophysical Union*.
- McGookey, Donald P., et al
1972 Cretaceous system. In: *Geological atlas of the Rocky Mountain region*. Rocky Mountain Association of Geologists, pp. 190-228.
- Nye, J.F.
1952 The mechanics of glacier flow. *Journal of Glaciology*, vol. 2, pp. 81-93.
- Price, W.A.
1943 Greater American deserts. *Texas Academy of Science, Proceedings and Transactions*, pp. 163-169.

- Ray, L.L.
1940 Glacial chronology of the southern Rocky Mountains. *Geological Society of America Bulletin* 51, no. 14, part 1: 1851-1917.
- Reiche, Parry
1950 A survey of weathering processes and products. *University of New Mexico Publications in Geology*, no. 3.
- Riggs, E.A.
1960 Map: major basins and structural features of the United States. Geographical Press, Mapewood, N.J.
- Sears, Paul B.
1935 Deserts on the march. Norman, University of Oklahoma Press.
- Thornbury, William D.
1965 Regional geomorphology of the United States. New York: John Wiley and Sons, Inc.
- Thornthwaite, C.W. and C.F.S. Sharpe and E.F. Doseh
1942 Climate and accelerated erosion in the arid and semi-arid southwest. U.S. Department of Agriculture Technical Bulletin 808.
- Thorp, James, W.M. Johnson, and E.C. Reed
1951 Some post-Pliocene buried soils of central United States. *Journal of Soil Science*, vol. 2, pp. 1-19.
- U.S. Geological Survey
1970 The National Atlas of the United States of America. Department of the Interior, Washington, D.C.
1971 National Atlas of the United States of America. United States Geological Survey, Washington.
- Washburn, A.L.
1973 Periglacial processes and environments. St. Martin's Press, New York. 320 pp.
- Wright, H.E., and D.G. Frey (editors)
1965 The Quaternary of the United States. Princeton University Press, Princeton.
- Zeuner, F.E.
1945 The Pleistocene period, its climate, chronology and faunal successions. Ray Society for 1942-1943, vol. 130. London.

PALEOCLIMATE

- Antevs, Ernst
1954 Climate of New Mexico during the last glacio-pluvial. *Journal of Geology*, vol. 62, no. 2, pp. 182-191.
1962 Late Quaternary climates in Arizona. *American Antiquity*, vol. 28, no. 2, pp. 193-198, Salt Lake City.
- Bachuber, Frederick W.
1971 Paleoclimatology of Lake Estancia, New Mexico. Unpublished PhD dissertation, University of New Mexico, Albuquerque.
- Brackenridge, G.R.
1978 Evidence for a cold, dry full-glacial climate in the American southwest. *Quaternary Research*, vol. 9, no. 2, pp. 22-40.
- Brooks, C.E.P.
1949 Climate through the ages: a study of the climatic factors and their variations. McGraw-Hill, New York.
1951 Geological and historical aspects of climatic change. In T.F. Malone's *Compendium of Meteorology*, pp. 1004-1018.
- Bryan, Alan L. and Ruth Gruhn
1964 Problems relating to the neothermal climatic sequence. *American Antiquity*, vol. 29, no. 3, Salt Lake City.
- Bryson, R.A. and W.M. Wendland
1967 Tentative climatic patterns for some late glacial and postglacial episodes in central North America. In: *Life, Land and Water*, ed. by W.J. Mayer-Oakes, *Occasional Papers*, Department of Anthropology, University of Manitoba.
- Bryson, R.A.
1974 A perspective on climatic change. *Science*, vol. 184, pp. 573-760.

- Cully, A.
1977 Paleoclimatic variability in the north middle Rio Grande, New Mexico. In Archeological investigations in Cochiti Reservoir, New Mexico vol. I: a survey of regional variability, edited by J. Biella and R. Chapman, Office of Contract Archaeology, University of New Mexico, Albuquerque.
- Deevey, Edward S., Jr.
1953 Paleolimnology and climate. In Harlow Shapley, ed., Climatic Change, ch. 22. Harvard University Press, Cambridge.
- Deevey, E.S., Jr., and R.F. Flint
1957 Postglacial hypsithermal interval. Science, vol. 125, no. 3240, pp. 182-184.
- Dillon, L.S.
1956 Wisconsin climate and life zones in North America. Science, vol. 123, no. 3188, pp. 167-176.
- Dort, Wakefield, Jr.
1970 Recurrent climatic stress on Pleistocene and Recent environments. In: Pleistocene and Recent Environments of the Central Great Plains, Wakefield Dort, Jr., and J. Knox Jones, Jr., editors. Department of Geology, University of Kansas, Special Publication 3, pp. 3-8.
- Douglass, A.E.
1936 Climatic cycles and tree growth. Publications, Carnegie Institution of Washington, no. 289, vol. III.
- Graham, Russell W.
1979 Paleoclimates and late Pleistocene faunal provinces in North America. In Pre-Llano Cultures of the Americas: Paradoxes and Possibilities, Robert L. Humphrey and Dennis Stanford. The Anthropological Society of Washington, pp. 49-69.
- Hafsten, U.
1961 Pleistocene development of vegetation and climate on the southern high plains as evidenced by pollen analysis. In: Paleoecology of the Llano Estacado, edited by F. Wendorf, pp. 59-91. Fort Burgwin Research Center Publication 1.
- Leonard, A.B., and J.C. Frye
1954 Ecological conditions accompanying loess deposition in the Great Plains region of the United States. Journal of Geology, vol. 62, pp. 299-404.
- Leopold, L.B.
1951 Pleistocene climate in New Mexico. American Journal of Science, vol. 249, pp. 152-168.
- Reeves, C.C., Jr.
1965 Pleistocene climate of the Llano Estacado. Journal of Geology, vol. 73, pp. 181-189.
- Russell, Richard Joel
1941 Climatic change through the ages. USDA Climate and Man, Yearbook of Agriculture, 1941, pp. 67-97.
1950 Some problems in Pleistocene climate. Proceedings of the Sixth Plains Archeological Conference (1948). Anthropological Papers, no. 11. Department of Anthropology, University of Utah, pp. 39-41.
- Van Royen, Willem
1937 Prehistoric droughts in the central Great Plains. Geographical Review, vol. 27, no. 4, pp. 637-650.
- Webb, Thompson III and Reid A. Bryson
1972 Late- and postglacial climatic change in the northern midwest, USA: quantitative estimates derived from fossil pollen spectra by multivariate statistical analysis. Quaternary Research, vol. 2, no. 1, pp. 70-115.

PALEONTOLOGY

- Allen, Glover M.
1942 Extinct and vanishing mammals of the western hemisphere. American Committee for International Wildlife Protection, Special Publication no. 11.
- Allen, J.A.
1876 The American bisons, living and extinct. Mem. Geological Survey of Kentucky, vol. 1, pt. 2.
1877 History of the American bison. Ninth Annual Report of the U.S. Geological and Geographical Survey of the territories, embracing Colorado and parts of adjacent territories, for the year 1875.

- Anderson, Elaine
 1974 A survey of the late Pleistocene and Holocene mammal fauna of Wyoming. In *Applied Geology and Archaeology: the Holocene History of Wyoming*, edited by Michael Wilson. Geological Survey of Wyoming, Report of Investigations no. 10.
- Barbour, E.H. and C.B. Schultz
 1936 Palaeontologic and geologic considerations of early man in Nebraska. *The Nebraska State Museum*, vol. 1, bull. 45, pp. 431-450, April.
- Barbour, E.H. and C.B. Schultz
 1937 Pleistocene and post-glacial mammals of Nebraska. In: *Early Man*, pp. 185-192, Philadelphia and New York.
- 1941 A new fossil bovid from Nebraska, with notice of a new bison quarry in Texas. *Bulletin of the University of Nebraska State Museum*, vol. 2, no. 7, pp. 63-68. Lincoln.
- Eiseley, Loren C.
 1943 Archaeological observations on the problem of post-glacial extinction. *American Antiquity*, vol. 8, no. 3, pp. 209-217.
- Evans, Glen L.
 1950 Late Quaternary faunal succession in the southern high plains (abstract). *Geological Society of America Bulletin*, vol. 61, no. 12, pt. 2, pp. 1457-1458.
- Gazin, C.L.
 1941 Paleocene mammals from the Denver basin, Colorado. *Washington Academy of Science Journal*, vol. 31, pp. 289-295.
- Hibbard, C.W., and D.W. Taylor
 1960 Two late Pleistocene faunas from southwestern Kansas. *Contributions from the Museum of Paleontology, University of Michigan*, 16.
- Hibbard, C.W.
 1963 A late Illinoian fauna from Kansas and its climatic significance. *Michigan Academy of Science, Arts and Letters Papers*, vol. 48, pp. 187-221.
- Leonard, A.B.
 1952 Illinoian and Wisconsinan molluscan faunas in Kansas. *University of Kansas Paleontological Contributions, Mollusca*, article 4. Topeka.
- Lundelius, E.L., Jr.
 1967 Late-Pleistocene and Holocene faunal history of central Texas. In: *Pleistocene Extinctions: the Search for a Cause*, edited by P.S. Martin and H.E. Wright, Jr., pp. 287-320. Yale University Press.
- 1974 The last fifteen thousand years of faunal change in North America. In: Craig C. Black (ed.), *History and Prehistory of the Lubbock Lake site*. *The Museum Journal*, vol. 15, pp. 141-160.
- Schultz, C. Bertrand and W.D. Frankforter
 1946 The geologic history of the bison in the Great Plains (a preliminary report). *Bulletin of the University of Nebraska State Museum*, vol. 3, pp. 1-10.
- Schultz, C.B. and T.M. Stout
 1948 Pleistocene mammals and terraces in the Great Plains. *Geological Society of America, Bulletin* 59, pp. 553-588.
- Schultz, C. Bertrand and W.D. Frankforter
 1949 Bison as index fossils. *Proceedings of the Fifth Plains Conference for Archeology*. University of Nebraska, Laboratory of Anthropology, note book no. 1, pp. 131-132.
- Schultz, C.B., W.D. Frankforter, and Loren Toohey
 1950 The Pleistocene mammals of the Great Plains and their bearing on the problems of human antiquity. *Proceedings of the Sixth Plains Archeological Conference (1948)*. *Anthropological Papers*, no. 11, p. 70. Department of Anthropology, University of Utah.
- Schultz, C.B., L.D. Martin, and L.G. Tanner
 1970 Mammalian distribution in the Great Plains and adjacent areas from 14,000 to 9,000 years ago. In: *Abstracts for papers presented at first meetings of the American Quaternary Association*, pp. 119-120. Bozeman, Montana.
- Schultz, Gerald E. and Elmer P. Cheatum
 1970 *Bison occidentalis* and associated invertebrates from the late Wisconsin of Randall County, Texas. *Journal of Paleontology*, vol. 44, no. 5, pp. 836-850.

PALEOBOTANY

Beetle, Alan A.

- 1974 Holocene changes in Wyoming vegetation. In *Applied geology and archaeology: the Holocene history of Wyoming*, edited by Michael Wilson, pp. 71-73.

Bernabo, J.C. and T. Webb, III

- 1977 Changing patterns in the Holocene pollen record of northern America: a mapped summary. *Quaternary Research*, vol. 8, no. 1, pp. 64-96.

Bessey, C.E.

- 1896 Were the sandhills of Nebraska formerly covered with forests? *Publications of the Nebraska Academy of Science, Proceedings for 1894-1895*, p. 7.

Bryant, Vaughn M., Jr.

- 1969 Late full-glacial and postglacial pollen analysis of Texas sediments. Unpublished Ph.D. dissertation, University of Texas, Austin.

King, James E.

- 1977 Holocene vegetational history of the midwest (abstract). *Program and Abstracts, 35th Plains Conference*, no. 13, Lincoln.

Krausel, Richard

- 1961 Palaeobotanical evidence of climate. In *Descriptive palaeoclimatology*, edited by A.E.M. Nairn, pp. 227-254. Interscience Publishers.

Martin, P.S.

- 1958 Pleistocene ecology and biogeography of North America. In: *Zoogeography*, edited by C.L. Hubbs, American Association for the Advancement of Science, no. 51, pp. 375-420.

- 1963 The last 10,000 years: a fossil pollen record of the American southwest. University of Arizona Press.

Martin, P.S. and P.J. Mehringer, Jr.

- 1965 Pleistocene pollen analysis and biogeography of the southwest. In: *The Quaternary of the United States*, ed. by H.E. Wright and D.G. Frey, pp. 433-451. Princeton University Press, Princeton.

Sears, Paul B.

- 1950 Forest sequence and climatic changes in northeastern North America since early Wisconsin times. *Proceedings of the Sixth Plains Archeological Conference (1948)*. *Anthropological Papers*, no. 11, pp. 67-68. Department of Anthropology, University of Utah.

Wright, H.E., Jr.

- 1970 Vegetational history of the Central Plains. In *Pleistocene and Recent environments of the central Great Plains*, edited by W. Dort, Jr., and J.K. Jones, Jr., pp. 157-172. Lawrence: University Press of Kansas.

MINERALS

Bowers, Roger Lee

- 1975 Petrography and petrogenesis of the Alibates dolomite and chert (Permian), northern panhandle of Texas, M.S. thesis, the University of Texas at Arlington.

Cooper, C.L. (editor)

- 1926 Bulletin no. 4, Coal in Oklahoma. Oklahoma Geological Survey, Norman.

Elston, W.E.

- 1967 Summary of mineral resources of Bernalillo, Sandoval, and Santa Fe counties, N.M., bulletin 81. Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro.

Fenneman, Nevin M.

- 1906 The Yampa coal fields, Routt county, Colorado. Washington, D.C.: Government Printing Office.

George, R.D.

- 1927 Geology and natural resources of Colorado. University of Colorado.

Harbour, R.L. and G.H. Dixon

- 1959 Coal resources of the Trinidad-Aguilar area, Las Animas and Huerfano counties, Colorado. *Geological Survey Bulletin 1072-G*, pp. 445-489.

Howard, E.V.

- 1967 Metalliferous occurrences in New Mexico. New Mexico State Planning Office, Santa Fe.

Johnson, K.S.

- 1969 Mineral map of Oklahoma (exclusive of oil and gas fields). Oklahoma Geological Survey Map GM-15, scale 1:750,000.

- Johnson, K.S. et al
1972 Geology and earth resources of Oklahoma--an atlas of maps and cross sections. Oklahoma Geological Survey Educational Publication 1.
- Kelley, V.C.
1972 Outcropping permian shelf formations of eastern New Mexico. In Guidebook of east-central New Mexico, ed. by V.C. Kelley and F.D. Trauger, pp. 72-78. New Mexico Geological Society.
- Larsen, E.S., Jr., and W. Cross
1956 Geology and petrology of the San Juan region, southwest Colorado. Geological Survey Professional Paper 258.
- Northrop, Stuart A.
1944 Minerals of New Mexico. Albuquerque, University of New Mexico Press.
- Osterwald, Frank W., and Doris B. Osterwald
1952 Wyoming mineral resources. Geological Survey of Wyoming Bulletin 45.
- Schilling, John H.
1960 Mineral resources of Taos County, New Mexico. State Bureau of Mines and Mineral Resources, Bulletin 71, Socorro.
- Shannon, C.W.
1916 Handbook on the natural resources of Oklahoma. Norman. Oklahoma Geological Survey.
- Six, Ray L.
1930 Beaver, Texas, and Cimarron counties. Oklahoma Geological Survey Bulletin, no. 40-VV.
- Snider, L.C.
1913 The gypsum and salt of Oklahoma. Oklahoma Geological Survey Bulletin no. 11, pp. 203-205.
- Snow, E.P.
1895 The Hartville iron ore deposits in Wyoming. Engineering and Mining Journal, vol. LX, pp. 320-321.
- Taylor, C.H.
1915 Granites of Oklahoma. Oklahoma Geological Survey Bulletin 20. U.S. Geological Survey
1965 Mineral and water resources of New Mexico. New Mexico Bureau of Mines and Mineral Resources, Bulletin 87, New Mexico Institute of Mining and Technology, Socorro.
- Van Alstine, Ralph E.
1969 Geology and mineral deposits of the Poncha Springs NE quadrangle, Chaffee County, Colorado. Geological Survey Professional Paper 626. Washington, D.C.: U.S. Government Printing Office.

SOILS

- Bacon, S.R., E.H. Tyner, W.L. Bruce, David Franzen, and D.B. Dodson
1939 Soil survey of Frontier County, Nebraska. U.S. Department of Agriculture, Bureau of Chemistry and Soils, series 1935, no. 9.
- Bailey, Oran F. and Richard D. Graft
1961 Soil survey of Jackson County, Oklahoma. United States Department of Agriculture. Series 1958, no. 4.
- Buol, S.W., F.D. Hole, and R.J. McCracken
1973 Soil genesis and classification. Iowa State University Press, Ames.
- Cornwall, I.W.
1958 Soils for the archaeologist. Macmillan Company, New York.
- Elder, John A.
1969 Soils of Nebraska. Resource Report no. 2, University of Nebraska - Conservation and Survey Division, Lincoln.
- Gray, Fenton and H.M. Galloway
1959 Soils of Oklahoma. Oklahoma State University Experiment Station, Miscellaneous Publications, no. 56. Stillwater.
- Hayes, F.A., W.J. Moran, S.R. Bacon, R.L. Gemmell, H. Otte, B.J. Abashkin, and E.A. Nieschmidt
1930 Soil survey of Hitchcock County, Nebraska. No. 8, series 1930. U.S. Department of Agriculture, Bureau of Chemistry and Soils.
- Johnstone, James G., Sutherams Ramanatham, and David Richards
1962 The soils of eastern Colorado: their origin, distribution and engineering characteristics. Quarterly of the Colorado School of Mines, vol. 57, pp. 1-71.

- Kellogg, Charles E.
 1941 Climate and soil. In *Climate and man: yearbook of agriculture, 1941*, edited by G. Hambridge, Dept. of Agriculture.
- Marbut, C.F.
 1935 Soils of the United States. In *Atlas of American Agriculture*, pt. 3, USDA.
- Meinder, Hadley C., Maurice Mitchell, Edward Grover, and Jimmie Fric
 1961 Soil survey, Texas County, Oklahoma. U.S.D.A. Series 1958, Bulletin no. 6.
- Mobley, H.L. and R.C. Brinlee
 1967 Soil survey of Comanche County, Oklahoma. U.S.D.A. Soil Conservation Service, U.S. Government Printing Office, Washington.
- Moran, W.J., R. Covell, and B.J. Abashkin
 1930 Soil survey of Harlan County, Nebraska. U.S. Department of Agriculture, Bureau of Chemistry and Soils (Soil Survey Re.), ser. 1930, no. 12.
- Soil Conservation Survey
 1972 General survey map of Adams County, Colorado. U.S. Department of Agriculture, Portland, Oregon.
- Soil Conservation Survey
 1972 General survey map of Huerfano County, Colorado. U.S. Department of Agriculture.
 1972 General survey map of Weld County, Colorado. U.S. Department of Agriculture, Portland, Oregon.
 1972 Soil survey of Lane County, Kansas. United States Department of Agriculture, Washington, D.C.
- Stringer, Billy R.
 1976 Soil survey of Hutchinson County, Texas. U.S. Department of Agriculture, Soil Conservation Service.
- Thorp, James
 1950 Soil studies and their implications for archeology. *Proceedings of the Sixth Plains Archeological Conference (1948)*. University of Utah, Department of Anthropology, Anthropological Papers, no. 11, pp. 73-77.
- United States Department of Agriculture
 1957 Soil. *United States Department of Agriculture, Yearbook of Agriculture 1957*. Washington.
- U.S. Department of Agriculture -Soil Conservation Service
 1975 Loamy foothill. Technical Guide, section IIE.
- Williams, Jack C. and Anthony J. Welker
 1966 Soil survey of Gray County, Texas. U.S. Soil Conservation Service. Temple, TX.
- Williams, Jack C., Anthony J. Welker, Frankie F. Wheeler, and Harry F. McEwen
 1974 Soil survey of Hemphill County, Texas. U.S. Soil Conservation Service. Temple, TX.
- Wolfanger, Lewis A. and R.F. Rogers
 1917 Soil survey for Chase County, Nebraska.

DATING

- Afton, Jean
 1977 Techniques for determining dates derived from a Cheyenne Indian sketchbook. *Southwestern Lore*, vol. 43, no. 2, pp. 11-31.
- Antevs, Ernst
 1950 Postglacial climatic history of the Great Plains and dating the records of man. *Proceedings of the Sixth Plains Archeological Conference (1948)*. Anthropological Papers no. 11. Dept. of Anthropology, University of Utah, pp. 46-50.
 1953 Geochronology of the deglacial and neothermal ages. *Journal of Geology*, vol. 61, no. 3, pp. 195-230.
 1954 Geochronology of the deglacial and neothermal ages: a reply. *Journal of Geology*, vol. 62, no. 5, pp. 516-521.
- Bastian, Tyler
 1964 Radiocarbon date for an archaic site in southwestern Oklahoma. *Oklahoma Anthropological Society Newsletter*, vol. 12, no. 9, pp. 1-4.
- Bell, Robert E.
 1968 Dating the prehistory of Oklahoma. *Great Plains Journal*, vol. 7, no. 2, pp. 42-52. Lawton.

- Bender, Margaret, Reid Bryson, and David Baerreis
 1966 University of Wisconsin radiocarbon dates II. Radiocarbon, vol. 8, pp. 522-533.
 1967 University of Wisconsin radiocarbon dates III. Radiocarbon, vol. 9, pp. 530-544.
 1971 University of Wisconsin radiocarbon dates IX. Radiocarbon, vol. 13, no. 2, pp. 476-479.
- Benedict, James
 1973 Chronology of cirque-glaciation, Colorado front range. Journal of Quaternary Research, vol. 3, pp. 584-599.
- Breternitz, David A.
 1966 An appraisal of tree-ring dated pottery in the southwest. Anthropological Papers of the University of Arizona, no. 10.
- Bryan, K.
 1925 Date of channel trenching (arroyo cutting) in the arid southwest. Science, vol. 62, pp. 338-344.
- Campbell, T.N.
 1961 A list of radiocarbon dates from archeological sites in Texas. Bulletin of the Texas Archeological Society, vol. 30, pp. 311-320.
- Crane, H.R. and James B. Griffin
 1962 University of Michigan radiocarbon dates VII. Radiocarbon, vol. 4, pp. 183-203.
- Frye, J.C. and A.B. Leonard
 1959 Correlation of the Ogallala Formation (Neogene) in western Texas with type localities in Nebraska. The University of Texas, Bureau of Economic Geology, Report of Investigations, no. 39. Austin.
- Haynes, C.V., Jr.
 1966 Geochronology of late Quaternary alluvium. Interim Research Report, no. 10. Geochronology Laboratories, University of Arizona, Tucson.
 1967 Carbon-14 dates and early man in the new world. In Pleistocene extinctions, edited by P.S. Martin and H.E. Wright, Jr., pp. 267-286. Yale University Press, New Haven.
 1968 Geochronology of late Quaternary alluvium. In: Means of correlation of Quaternary successions, edited by R.B. Morrison and H.E. Wright, Jr. Salt Lake City: University of Utah Press, pp. 591-631.
- Hester, J.J.
 1960 Pleistocene extinction and radiocarbon dating. American Antiquity, vol. 26, no. 1, pp. 58-77.
- Husted, Wilfred Marston
 1962 A proposed archeological chronology for ROMO. Master's Thesis, Department of Anthropology, University of Colorado. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Krieger, Alex
 1947 The eastward extension of Puebloan datings toward cultures of the Mississippi valley. American Antiquity, vol. 12, no. 3, pp. 141-148. Menasha.
- Kulp, J.L., L.E. Tryon, W.R. Eckelman, and W.A. Snell
 1952 Lamont natural radiocarbon measurements, II. Science, vol. 116, pp. 409-414.
- Leopold, Luna B. and John P. Miller
 1954 A postglacial chronology for some alluvial valleys in Wyoming. U.S. Geological Survey, Water Supply Paper 1261.
- Lougee, Richard
 1953 A chronology of post glacial time in eastern North America. The Scientific Monthly, vol. 76, no. 5, pp. 259-276. Lancaster, Pennsylvania.
- Miller, John P. and Fred Wendorf
 1958 Alluvial chronology of the Tesuque valley, New Mexico. The Journal of Geology, vol. 66, no. 2.
- Muehlberger, W.R.
 1955 Relative age of Folsom man and Capulin mountain eruption, Colfax and Union counties, New Mexico (abstract). Geological Society of America, Bulletin, vol. 66, pp. 1600-1601.
- Neuman, R.W.
 1967 Radiocarbon-dated archaeological remains on the northern and central Great Plains. American Antiquity, vol. 32, no. 4, pp. 471-486. Salt Lake City.
- Pearson, F.J., et al
 1965 The University of Texas radiocarbon dates III. Radiocarbon, vol. 7, pp. 296-314.

- Pearson, F.J., E. Mott Davis, and Alejandra Varela
1977 University of Texas at Austin, radiocarbon dates XI. *Radiocarbon*, vol. 19, no. 2, pp. 280-325.
- Roper, Donna
1976 A trend surface analysis of central plains radiocarbon dates. *American Antiquity*, vol. 41, no. 2, pp. 181-189.
- Skinner, Hubert C.
1960 Tentative correlations of Oklahoma Quaternary deposits with the alluvial chronology. *Papers in Anthropology*, vol. 1, no. 1, pp. 35-42. Norman.
- Smiley, Terah L., Stanley A. Stubbs and Bryant Bannister
1953 A foundation for the dating of some late archaeological sites in the Rio Grande area, New Mexico, based on studies in tree-ring methods and pottery analysis. *University of Arizona, Laboratory Bulletin of Tree Ring Research*, no. 6. Tucson.
- Smiley, Terah L. (ed.)
1955 Geochronology with special reference to southwestern United States. *Physical Science Bulletin*, no. 2, *University of Arizona Bulletin Series*, vol. 26, no. 2, pp. 1-200. Tucson.
- Suess, H.E.
1956 Absolute chronology of the last glaciation. *Science*, vol. 123, no. 3192, pp. 355-357.
- Valastro, S., Jr., F.J. Pearson, Jr., and E. Mott Davis
1967 University of Texas radiocarbon dates V. *Radiocarbon*, vol. 9, pp. 439-453.
- Valastro, S., E. Mott Davis, Alejandra Varela
1977 University of Texas at Austin radiocarbon dates XI. *Radiocarbon*, vol. 19, no. 2, pp. 280-325.
- Weakly, Harry E.
n.d. Dendrochronology and archeology in Nebraska. MS on file, Midwest Archeological Center, National Park Service. Lincoln.
- 1940 Tree-rings as a record of precipitation in western Nebraska. *TreeRing Bulletin*, vol. 6, no. 3, pp. 18-19.
- 1943 A tree-ring record of precipitation in western Nebraska. *Journal of Forestry*, vol. 41, no. 11, pp. 816-819.
- 1949 Dendrochronology in Nebraska. *Proceedings of the Fifth Plains Conference for Archeology*. University of Nebraska, Laboratory of Anthropology Note Book no. 1, pp. 111-114.
- 1950 Dendrochronology and its climatic implications in the central plains. *Proceedings of the Sixth Plains Archeological Conference (1948)*. *Anthropological Papers*, no. 11, pp. 90-94. Dept. of Anthropology, University of Utah.
- Weakly, Ward F.
1964 Dendrochronology in the central plains. *Kansas Anthropological Association Newsletter*, vol. 10, no. 2.
- Wendland, W.M. and R.A. Bryson
1974 Dating climatic episodes of the Holocene. *Quaternary Research*, vol. 4, pp. 9-24.
- Zeuner, F.E.
1946 *Dating the past, an introduction to geochronology*. London.

HISTORY

- Albright, John and Douglas D. Scott
1974 Historic furnishing study, historical and archeological data, Fort Larned National Historic Site, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Applegarth, John S.
1978 Analysis of archaeofaunal remains recovered by Douglas C. Comer from Barrow pit dumps at Bent's Old Fort. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Athearn, Frederic J.
1985 *Land of contrast: a history of southeast Colorado*. Denver: Bureau of Land Management, Cultural series 17.
- Barr, Thomas P.
1967 Fort Hays archeology, 1967. *Kansas Anthropological Association News letter*, vol. 13, no. 2, pp. 7-9.

- 1970 Field season at Old Fort Hays, 1969. *Kansas Anthropological Association Newsletter*, vol. 15, no. 7.
- Calabrese, Francis A.
1966 Summary of the excavation of the Sutler's Store, Fort Hays, Kansas. *Kansas Anthropological Association Newsletter*, vol. 12, no. 3, pp. 13.
- Campbell, R.G.
1970 Hispano ethnobotany in the southern plains. Twenty-eighth Plains Anthropological Conference, Abstracts of Papers, Tulsa.
- Cheedle, Nancy Sue
1972 Hamill House: restoration and preservation: a study in historical archaeology. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Colorado Historical Society
1977 Bent's Old Fort. *Colorado Magazine*, vol. 54, no. 4. Copy on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Ervine, Alicia
1955 The story of Fort Lupton. *Southwestern Lore*, vol. 21, no. 3, pp. 4143.
- Fenn, Dennis B. and John R. Deck
1978 Mud plaster preservation research, Bent's Old Fort National Historic Site. Third report. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Fenn, Dennis B., John R. Deck, Walter P. Herriman, and John R. Vincent
1979 Chemical stabilization methods research at Chaco Canyon National Monument and Bent's Old Fort National Historic Site. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Freed, Elaine and David Barber
1977 Historic sites and structures, El Paso County, Colorado. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Fritz, Percy
1941 *Colorado: the centennial state*. Prentice-Hall, New York.
- Hafen, LeRoy (editor)
1948 *Colorado and its people: a narrative and topical history of the centennial state* (2 vol.). Lewis Historical Publishing Co., New York.
- Haley, J. Evetts
1949 Charles Goodnight; cowman and plainsman. *Great Plains Journal*, vol. 2, no. 1, pp. 22-28.
- Hall, Frank
1889 *History of the state of Colorado* (4 vol.). The Blakely Printing Co., Chicago.
- Hayden, F.V. (editor)
1869 Geological report of the exploration of the Yellowstone and Missouri rivers, under the direction of Captain W.F. Raynolds, Corps of Engineers, 1859-1860. Washington.
1867- U. S. geologic survey of the territories annual report. 1st-12th. 1867-1878. Washington:
1883 Government Printing Office.
- Holden, W.C.
1944 Coronado's route across the staked plains. *West Texas Historical Association Year Book*, vol. 20, pp. 3-20, Lubbock.
- Ireland, Stephen K.
1973 Penitente architecture at the mouth of Long Canyon, Las Animas County, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Ireland, Stephen K. and Ruth H. Henritze
1973 Penitente architecture at the mouth of Long Canyon. Trinidad State Junior College, National Park Service. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Jones, Bruce A.
1977 The crossing on the Little Arkansas: individuals and events in Kansas history. *Kansas Anthropological Association Newsletter*, vol. 23, nos. 2-3, pp. 13-28.
- Kelso, Gerald K.
1976 Pollen analysis of samples from two trash dumps at Bent's Old Fort. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.

- Leonard, Robert W., Jr.
1978 Archaeological surveillance and excavations, Bent's Old Fort National Historic Site, La Junta, Colorado. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Mehls, Steven F.
1984 The new empire of the rockies: A history of northeast Colorado. Denver: Bureau of Land Management. Cultural Series 16
- Midgorden, J. Scott
1970 Some additional information on the trading house at the walnut crossing. Kansas Anthropological Association Newsletter, vol. 16, no. 4.
- Mills, John E.
1953 Excavations at Camp Kirwan, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Monger, Earl W.
1976 A report on the archaeological salvage of the various projects at Fort Larned National Historic site of 1976. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Moore, Jackson W., Jr., Dwight E. Stinson, Jr., and Foy L. Young
1965 Historic structures report, part 2, reconstruction of Bent's Old Fort National Historic Site. Report on file, National Park Service. Midwest Archeological Center, Lincoln, Nebraska.
- Moore, Jackson W., Jr.
1967 Archeology of Bent's Old Fort. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Morris, Elizabeth Ann, David McComb and James R. Marcotte
1977 Fort Collins old city dump: archaeological excavations. Colo. State Univ. for the city of Fort Collins. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Murray, Robert A.
1978 A history of the Raton basin: Las Animas, Huerfano and Custer-three Colorado counties on a cultural frontier. Bureau of Land Management, Cultural Resource series 6. On file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Nelson, Sarah M.
1979 Four Mile historic park: 1979 excavations. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Nickel, R.K.
1976 Archeological survey Bent's Old Fort National Historic Site and adjacent lands. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Peters, Bette
1976 Four Mile house (1864-1976) historical research. Report on file, Office of the State Archaeologist, Colorado Heritage Center, Denver.
- Rathjen, Frederick W.
1973 The Texas panhandle frontier. The University of Texas Press, Austin.
- Scott, Douglas Dowell
1973 The archeology of Fort Larned National Historic Site, Kansas. Masters thesis, Department of Anthropology, University of Colorado. Report on file, Natl. Park Service, Midwest Archeological Center, Lincoln, NE.
- Scott, Douglas Dowell
1974 Archeological salvage during the enlisted barracks restoration at Fort Larned National Historic Site. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
1975 A report on the archeological salvage of the north side of HS 1, Fort Larned National Historic Site. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Spears, W. Steven
1978 Archeological investigation of historic building 3, Fort Larned National Historic Site, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Taylor, Morris F.
1966 Trinidad, Colorado territory. Trinidad State Junior College, Trinidad, Colorado.
- Thoburn, Joseph B. and Muriel Wright
1929 Oklahoma: a history. Lewis Historical Publishing Company, New York.

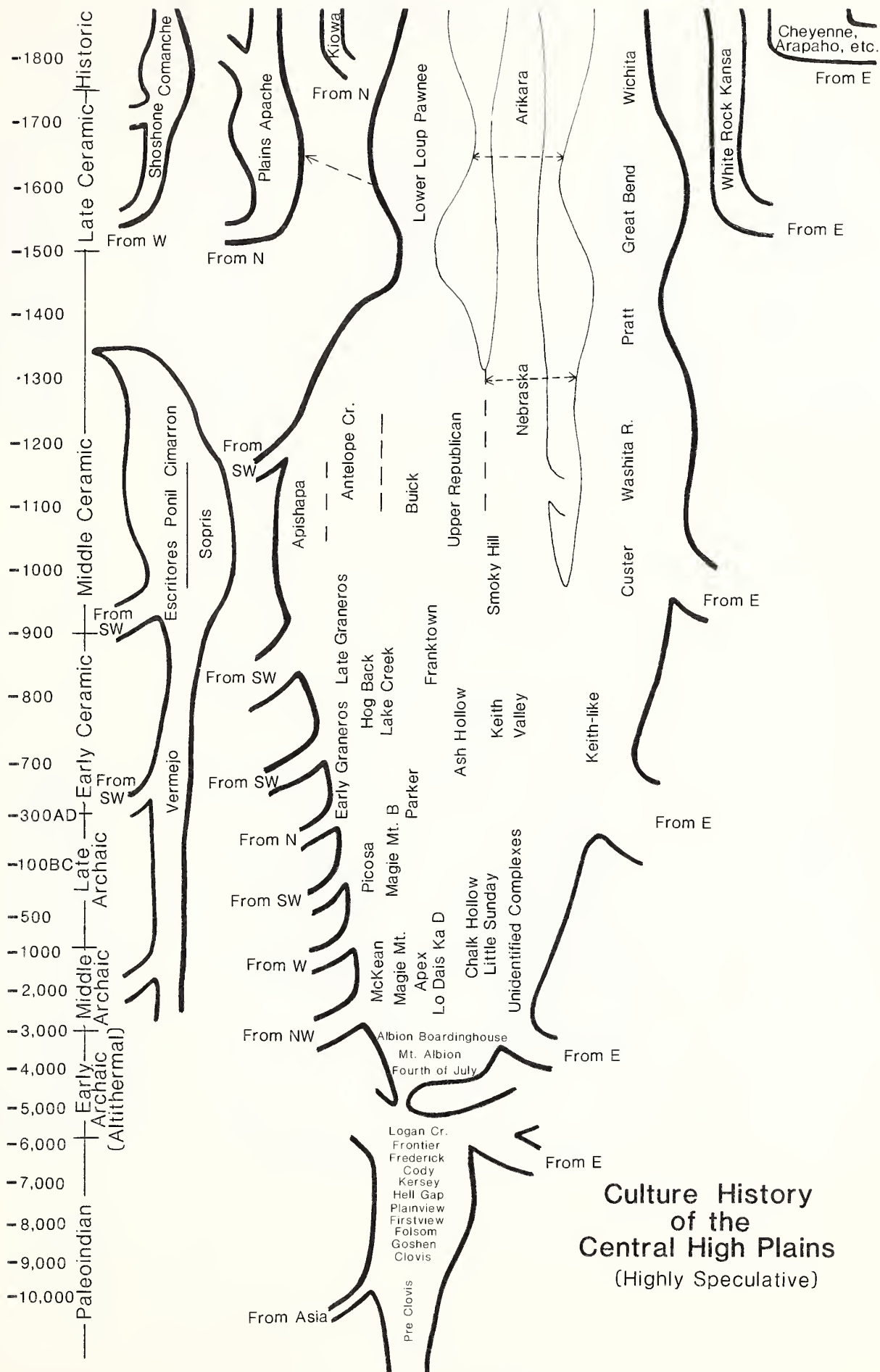
- Ubbelohde, Carl, Maxine Benson, and Duane Smith
 1976 A Colorado history. Pruett Publishing Co., Boulder.
- Weymouth, John W.
 1978 A magnetic survey at Fort Larned National Historic Site. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Wilson, Rex L.
 1964 The place of the outdoor privy in historic site archeology. Report on file, National Park Service, Midwest Archeological Service, Lincoln, Nebraska.
- Zalucha, L. Anthony and Danny E. Olinger
 1977 Archeological investigations, Fort Larned National Historic Site, Kansas. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.

PROGRAMS AND PROCEDURES

- Adair, Mary and Kenneth Brown
 1977 Prehistoric cultural resources in Kansas: some problem areas. Kansas Anthropological Society Newsletter, vol. 22, no. 9, pp. 1-13.
- Cultural Properties Review Committee
 1971 Historic preservation a plan for New Mexico. New Mexico State Planning Office, Santa Fe.
 1973 The historic preservation program for New Mexico. New Mexico State Planning Office, Santa Fe.
 1973 The historic preservation program for New Mexico, volume II: the inventory. New Mexico State Planning Office, Santa Fe.
- Eddy, Frank W.
 1974 Resource management and locational strategies of certain prehistoric sites in central Texas. Plains Anthropologist, vol. 19, no. 64, pp. 99-106.
- Gooding, John D.
 1974 The highway salvage program in Colorado. Southwestern Lore, vol. 40, nos. 3-4, pp. 7-11.
- History Division, National Park Service
 1953 Report on the inter-agency salvage program. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- King, Thomas, Patricia Hickman, and Gary Berg
 1977 Anthropology in historic preservation: caring for culture's clutter. Academic Press, New York.
- Oklahoma Historical Society
 1976? Annual preservation program for 1976-1977: historic preservation, a plan for Oklahoma. Oklahoma City, Oklahoma.
- Roberts, Frank H.H., Jr.
 n.d. The inter-agency archeological and paleontological salvage program. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Roberts, Frank H.H., Jr. (editor)
 1963 River basin surveys papers: inter-agency archeological salvage program, numbers 26-32. Smithsonian Institution, Bureau of American Ethnology, bulletin 185.
- Stephenson, Robert L., Chairman
 1962 Salvage archaeology in the plains. Plains Anthropologist, vol. 7, no. 16, pp. 77-81.
- Stout, Carol
 1977 Cultural resources literature and information search for U.S. Fish and Wildlife, region two refuges, lower Colorado River, Arizona, New Mexico, Oklahoma and Texas. MS on file at U.S. Fish and Wildlife Office, Albuquerque, and Oklahoma Archaeological Survey, Norman.
- Wedel, Waldo R.
 n.d. Salvage archeology in the Missouri River basin. Report on file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.
- Williams, Lance Robert
 1977 Vandalism to cultural resources of the Rocky Mountain West. Master's thesis, Colorado State University, Fort Collins, Colorado. On file, National Park Service, Midwest Archeological Center, Lincoln, Nebraska.

APPENDIX I

POINT TYPES



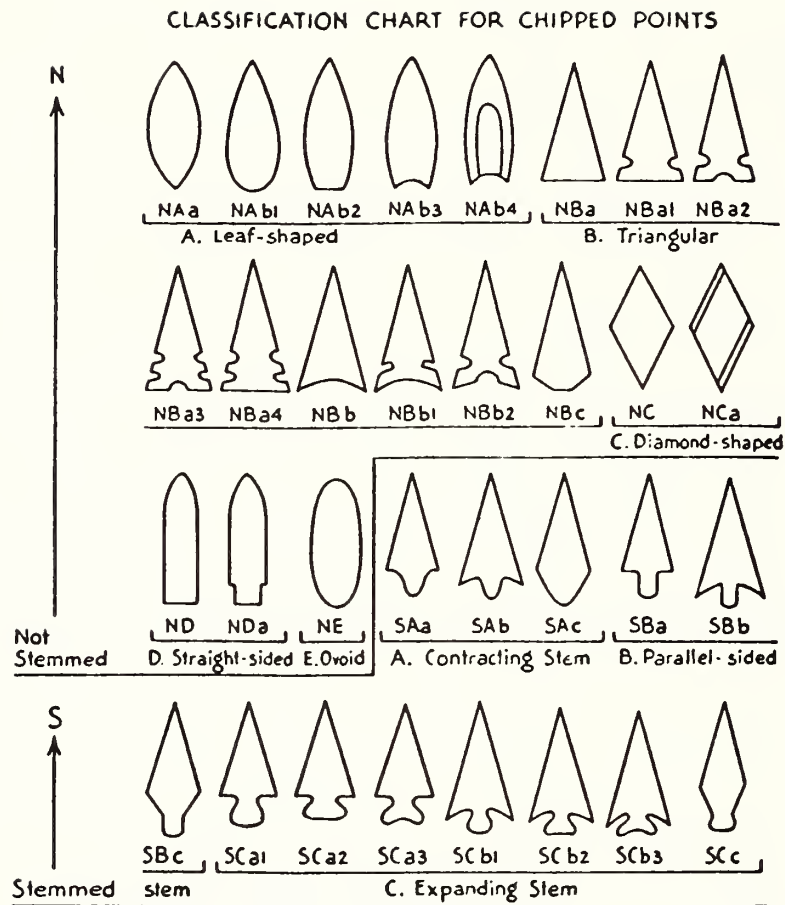


FIG. 7.—Form classification for chipped points

(Strong 1935:88)

ABASOLO

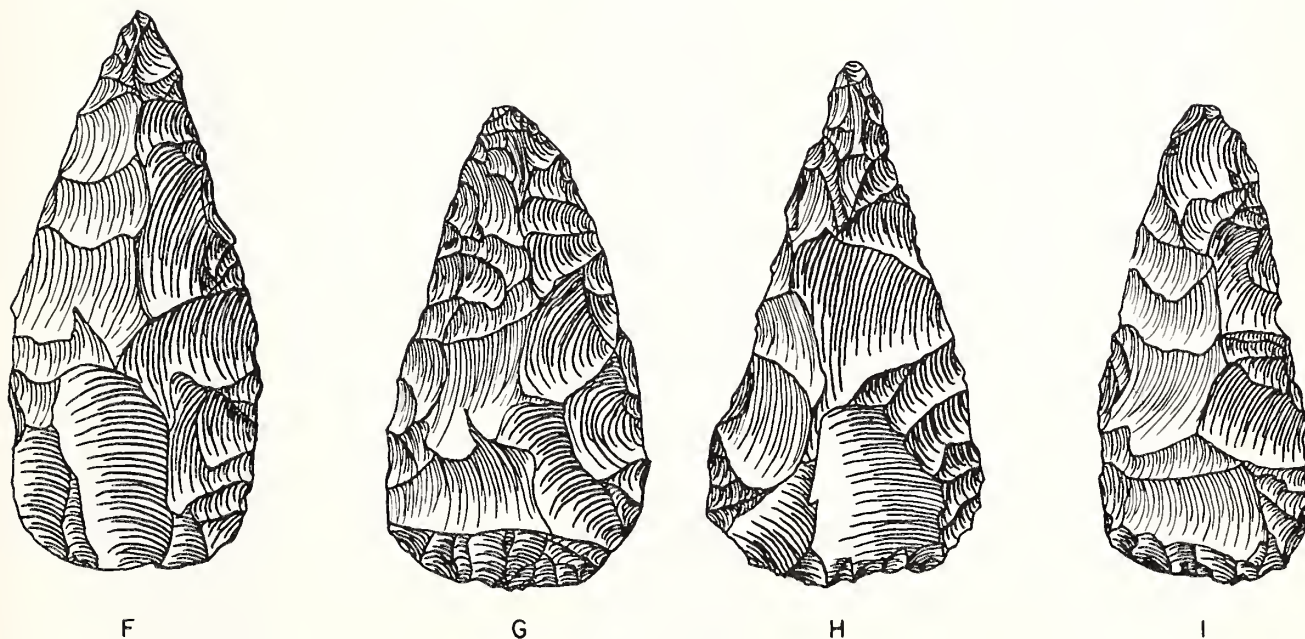
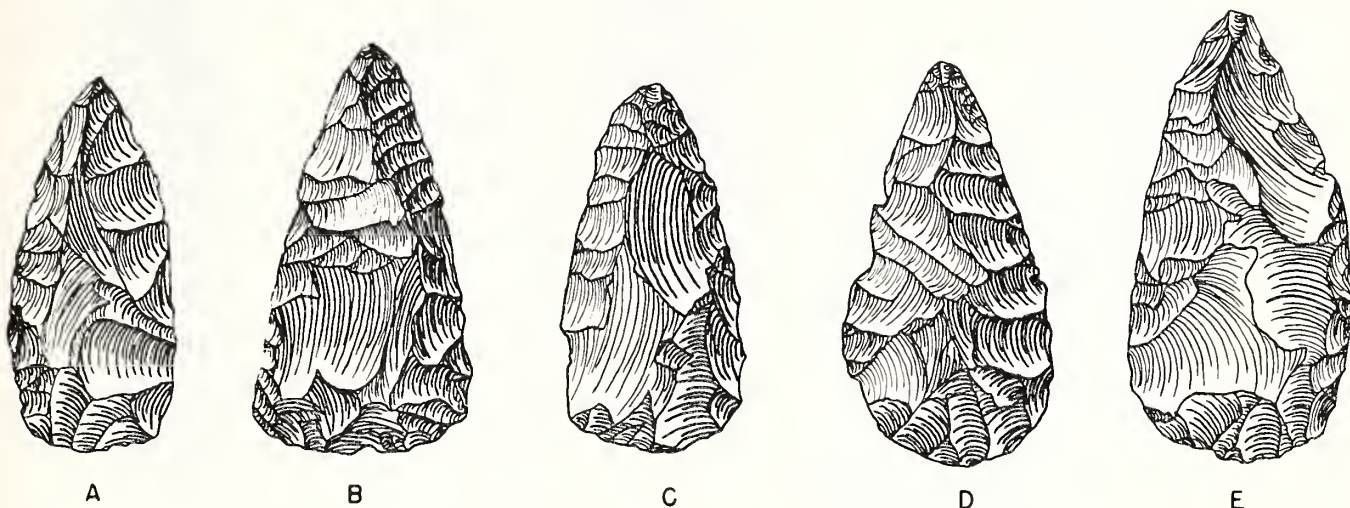


Plate 1

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

AGATE BASIN



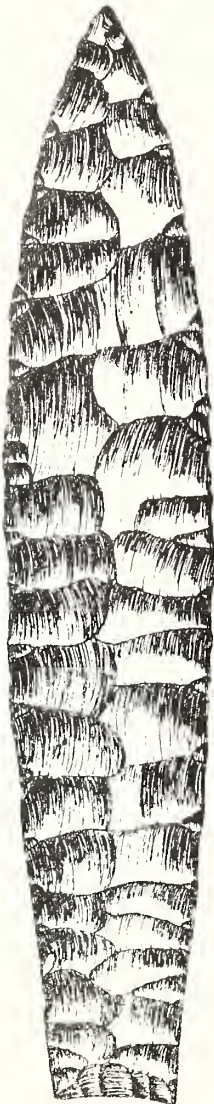
A



B



C



D



E



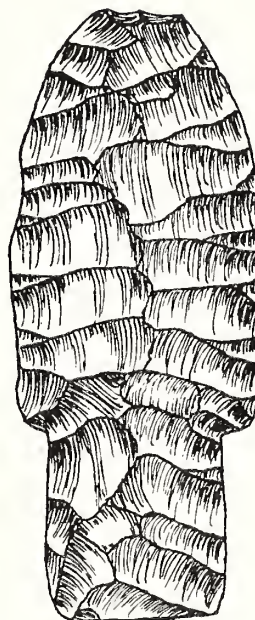
F

Plate 1

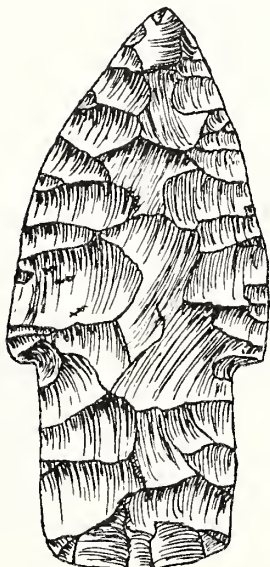
ALBERTA



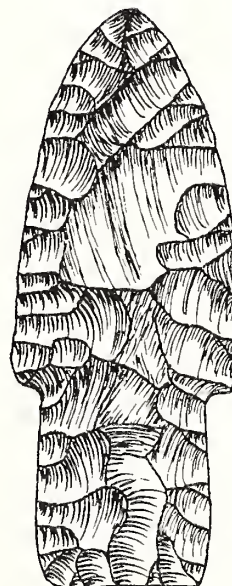
A



B



C



D

Plate 1

ALLEN



A



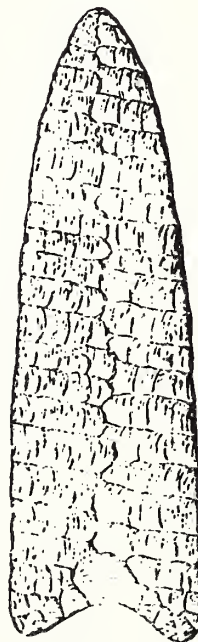
B



C



D



E



F

AVONLEA



A



B



C



D



E



F



G



H



I



J



K



L



M



N

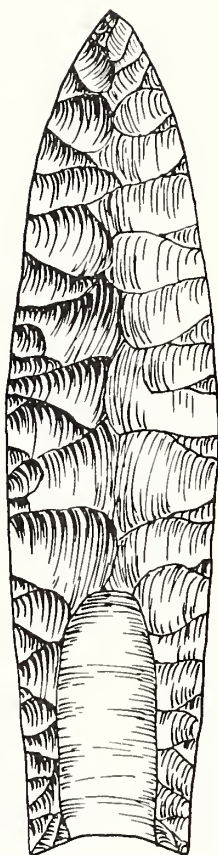


O

Plate 3

From: Penno (1903) *Journal of the Anthropological Society*

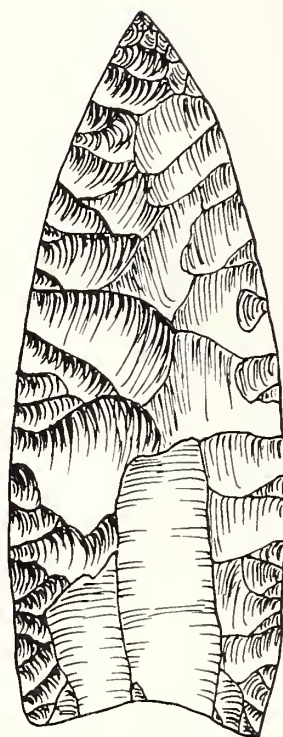
CLOVIS



A



B



C



D



E



F

Plate 8

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

DALTON



A



B



C



D



E



F



G



H



I

Plate 9

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

DUNCAN



A



B



C



D



E



F



G



H



I

EDEN



A



B



C



D



E



F

EDGEWOOD



A



B



C



D



E



F



G



H



I



J

ELLIS



A



B



C



D



E



F



G



H



I



J



K



L

FOLSOM



A



B



C



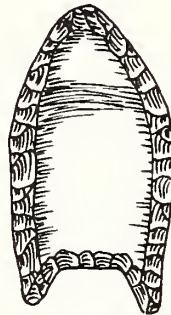
D



E



F



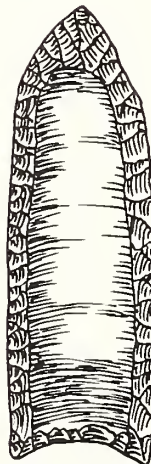
G



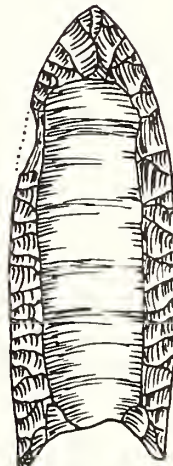
H



I



J



K

Plate 13

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

FRESNO

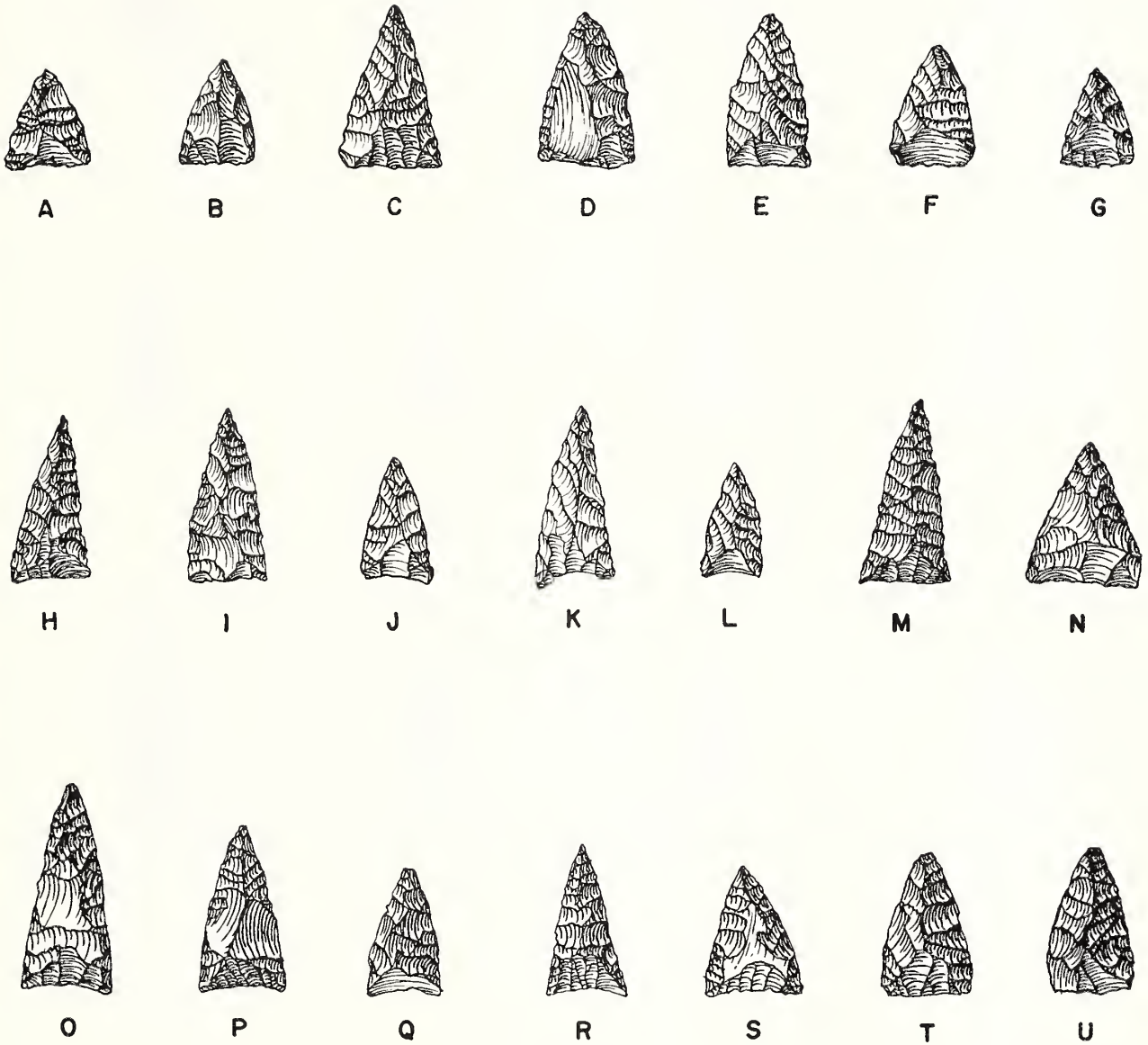


Plate 22

From: Bell (1960) Courtesy: Oklahoma Anthropological Society

GARZA



A



B



C



D



E



F



G



H



I



J



K



L



M



N

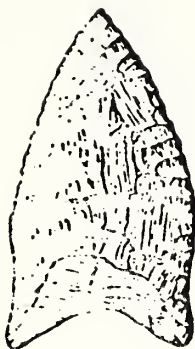


O

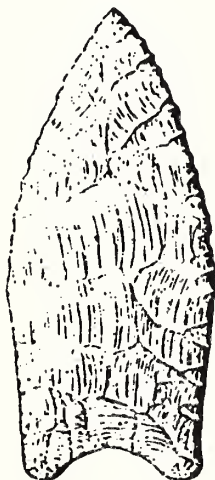


P

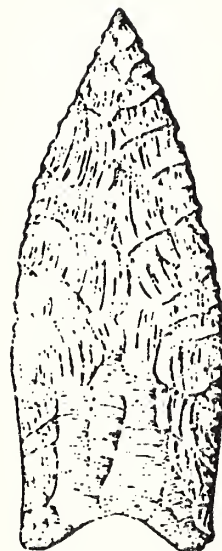
GOLONDRINA



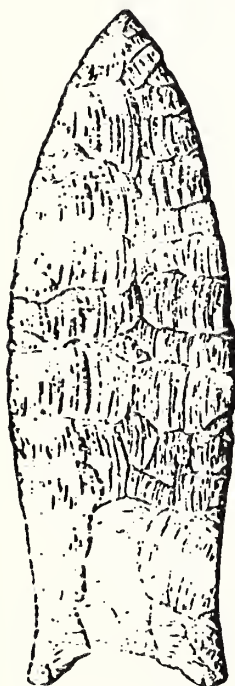
A



B



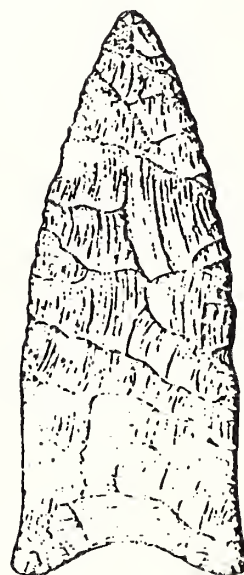
C



D



E



F

HANNA



A



B



C



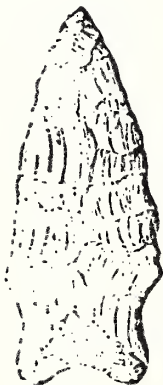
D



E



F



G

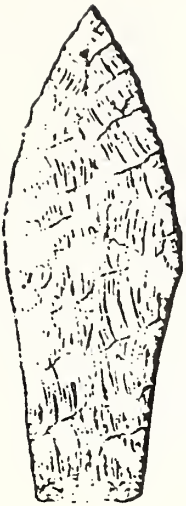


H



I

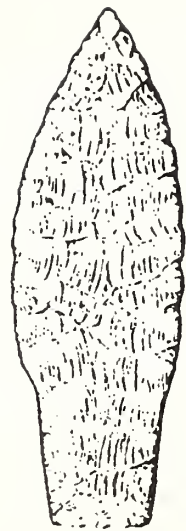
HELL GAP



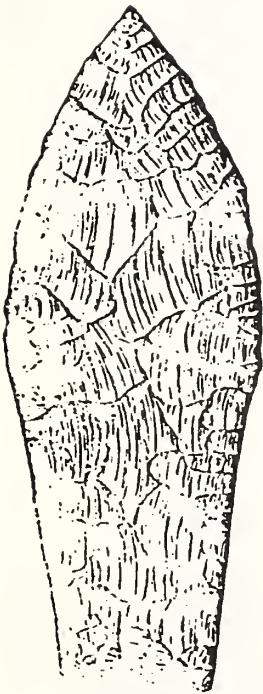
A



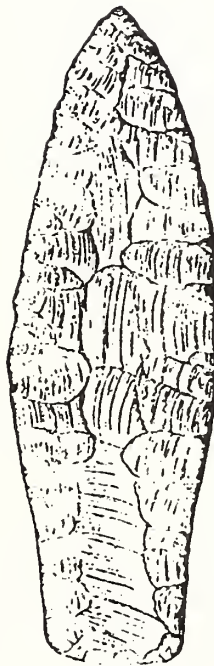
B



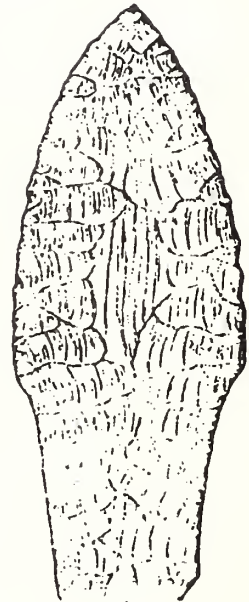
C



D



E



F

LATE WOODLAND



A



B



C



D



E



F



G



H



I



J



K



L



M



N



O



P

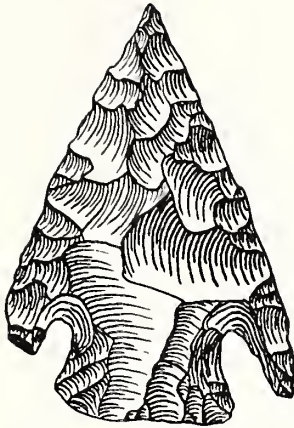


Q

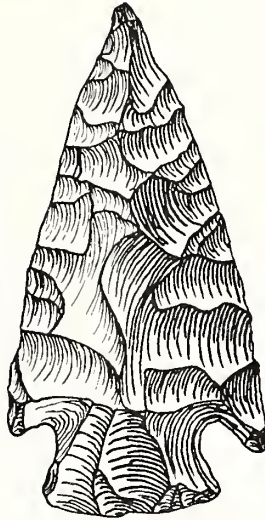


R

MARCOS



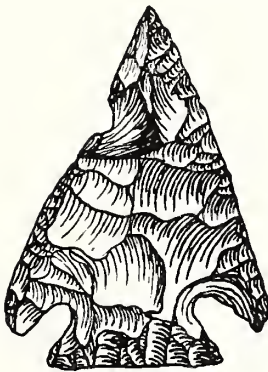
A



B



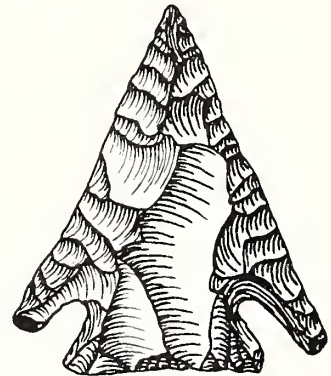
C



E



F



G



H



I



J

Plate 21

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

McKEAN



Plate 25

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

MESERVE



A



B



C



D



E



F



G



H

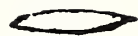


I

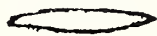
Plate 26

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

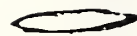
MIDLAND



A



B



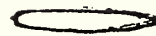
C



D



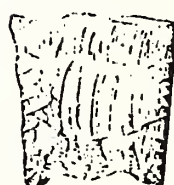
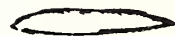
E



F



G



H



I

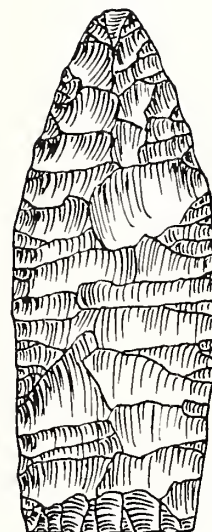
MILNESAND



A



B



C



D



E



F

PALMILLAS



A



B



C



D



E



F



G



H

Plate 37

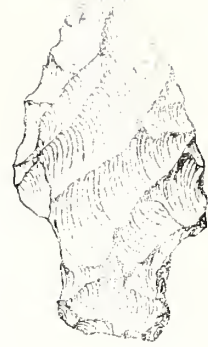
From: Bell (1960) Courtesy, Oklahoma Anthropological Society



A



B



C



D



E



F



G



H



I

PEDERNALES

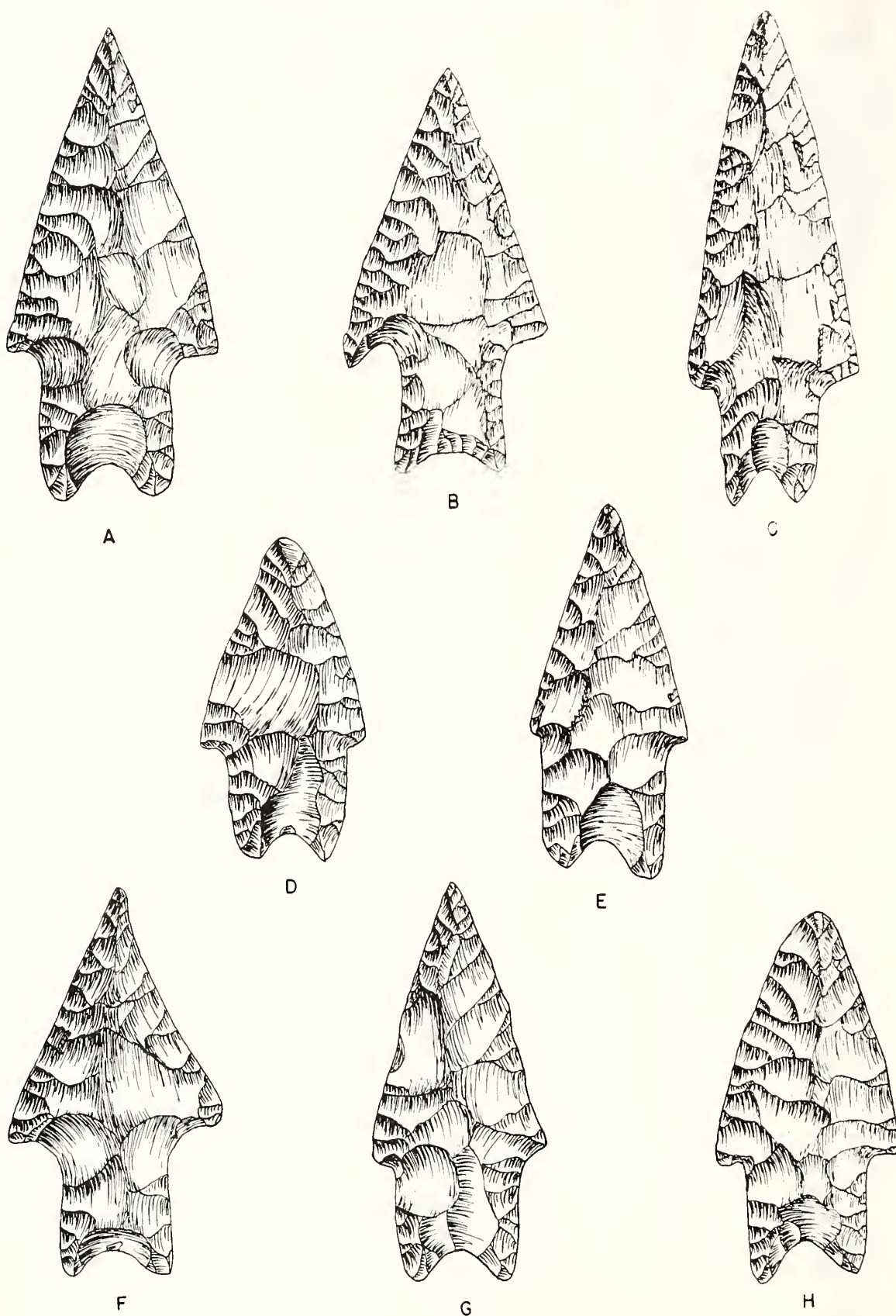
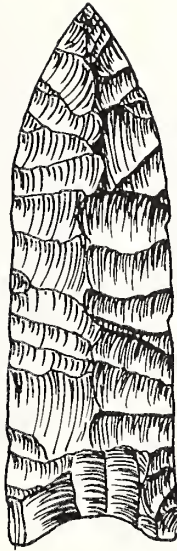


Plate 36

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

PLAINVIEW



A



B



C



D

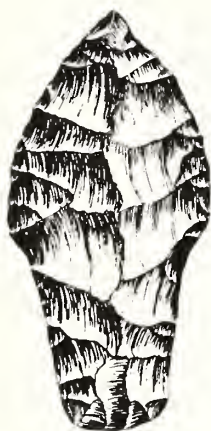


E



F

RIO GRANDE



A



B



C



D



E

Plate 39

From: Perino (1968) Courtesy: Oklahoma Anthropological Society

SANDIA I



A



B



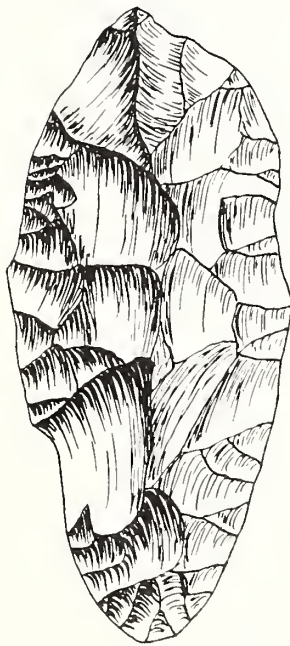
C



D



E



F

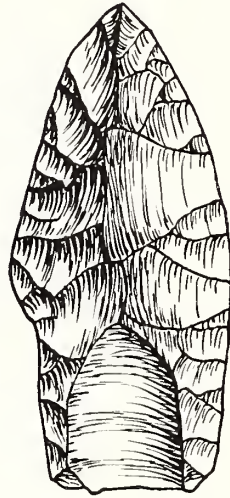


G

SANDIA II



A



B



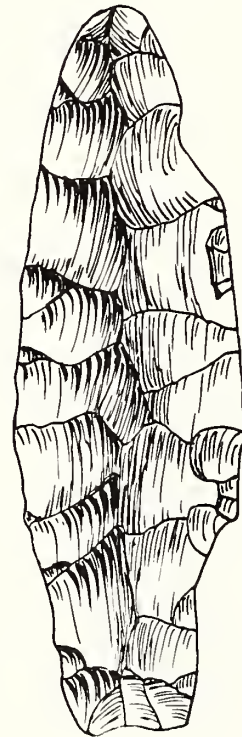
C



D

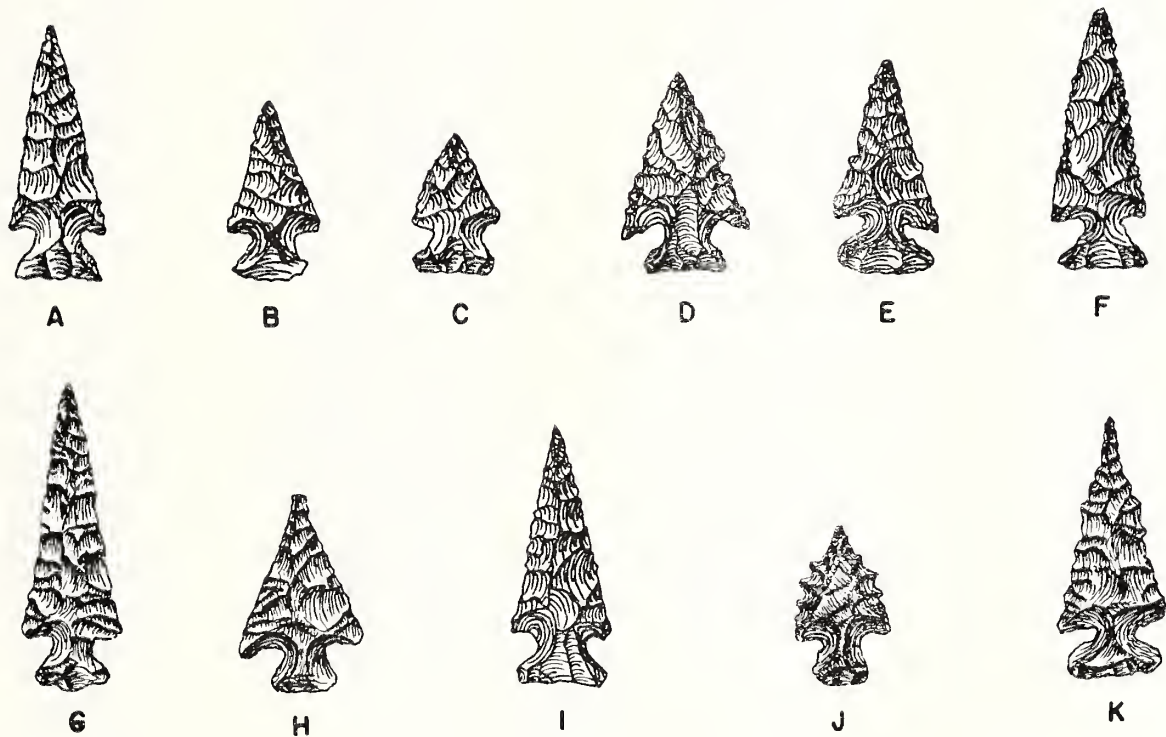


E



F

SCALLORN



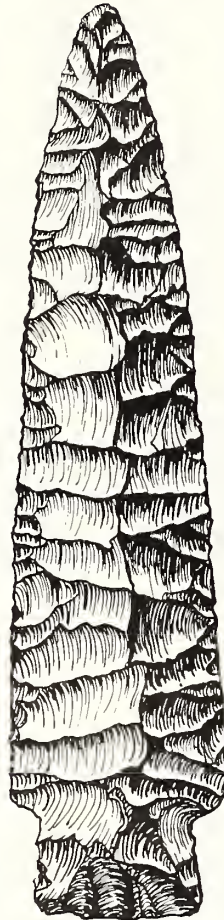
SCOTTSBLUFF



A



B



C



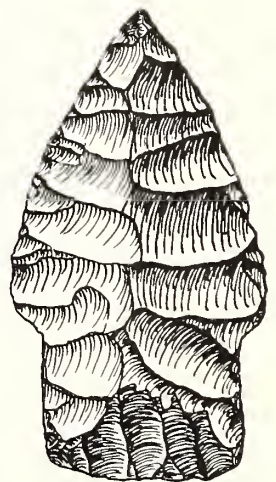
D



E



F

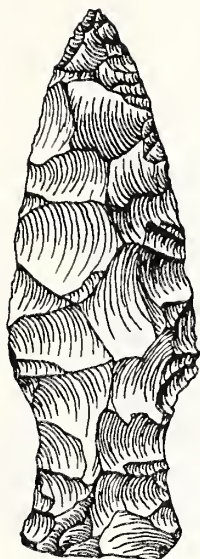


G

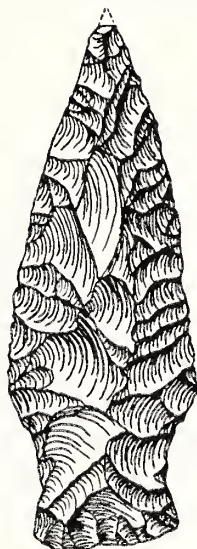
Plate 43

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

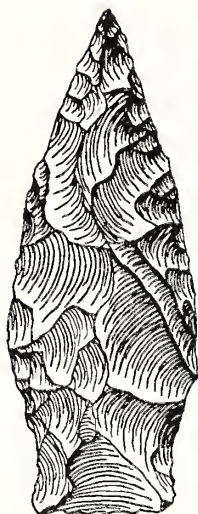
TRAVIS



A



B



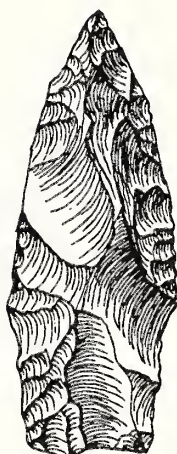
C



D



E



F



G



H



I



J



K

Plate 47

From: Bell (1958) Courtesy: Oklahoma Anthropological Society

TRINITY



A



B



C



D



E



F



G



H



I



J



K



L



M



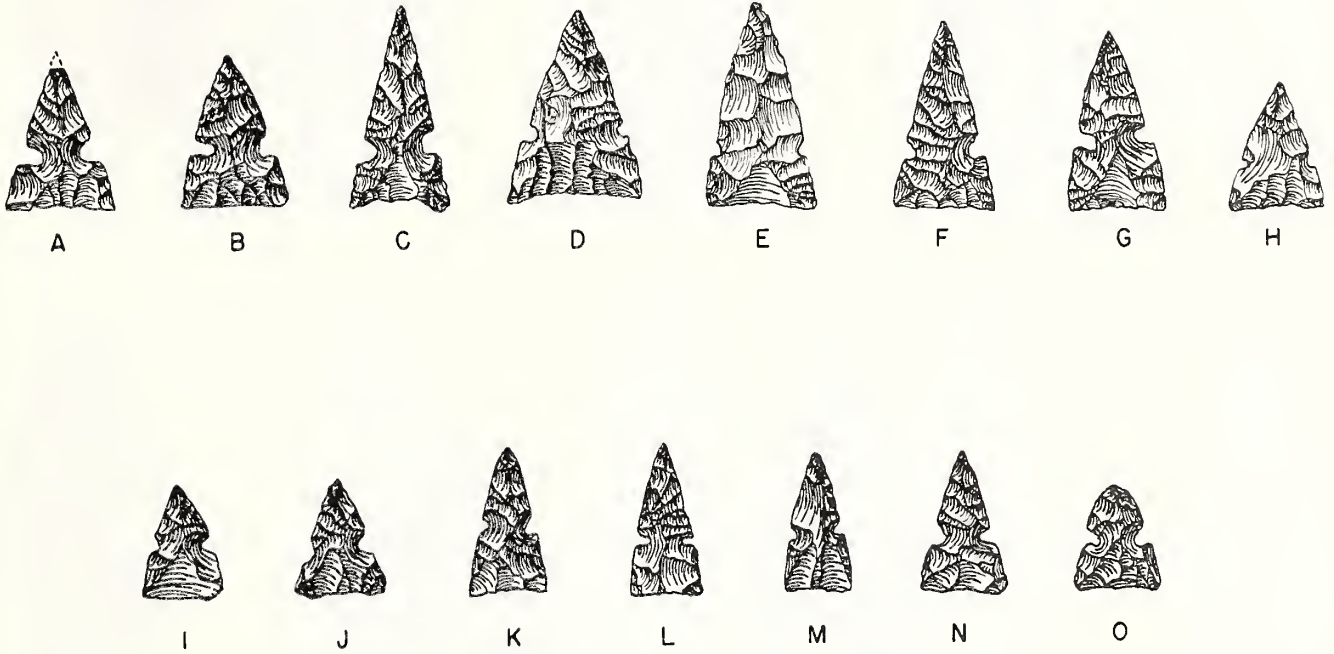
N



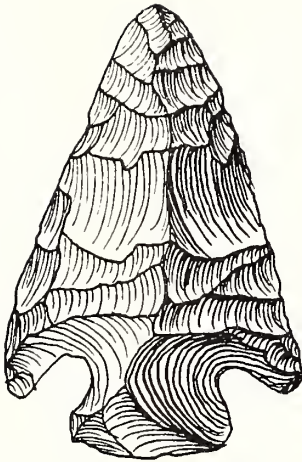
O

Plate 48

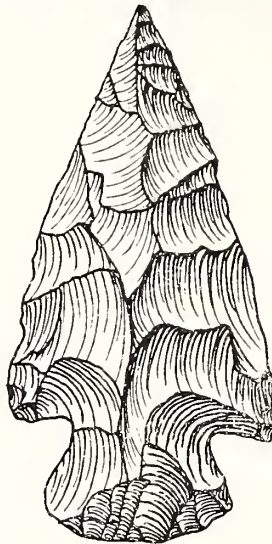
WASHITA



WILLIAMS



A



B



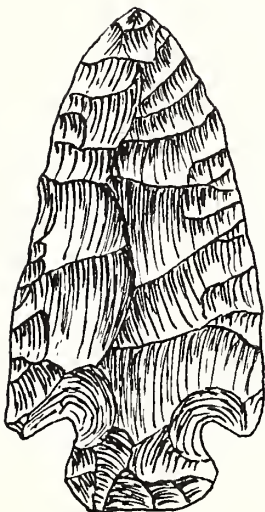
C



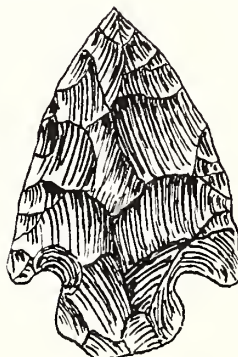
D



E



F



G



H

Plate 48

From: Bell (1960) Courtesy: Oklahoma Anthropological Society

YARBROUGH



A



B



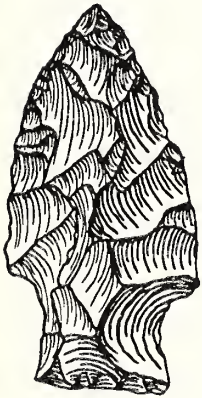
C



D



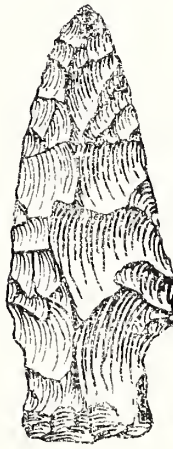
E



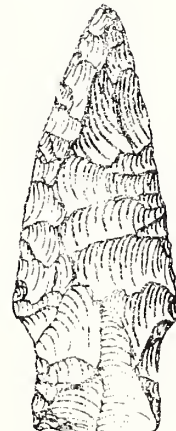
F



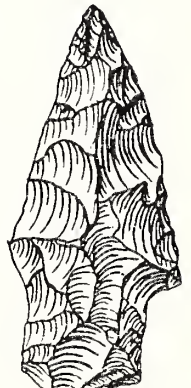
G



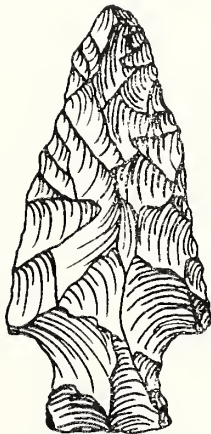
H



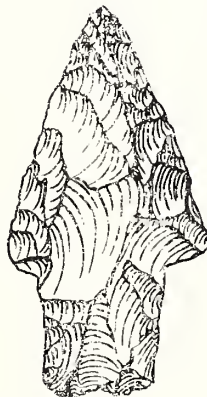
I



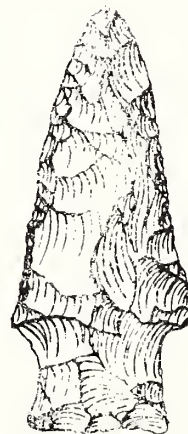
J



K



L



M

Plate 49

ABOUT THE AUTHOR

James H. Gunnerson was born in Nebraska where he was exposed early to archeology and to anthropology in general. After completing his undergraduate degree in Chemistry at the University of Nebraska in 1949, and his Masters degree in Anthropology there the following year, he went to Harvard University where he earned his Ph.D in Anthropology in 1963. He has been professionally employed at the University of Utah, Northern Illinois University, and the University of Nebraska, Lincoln. Since 1974 he has been Professor and Curator of Anthropology in the University of Nebraska State Museum, of which he was a director from 1974 to 1982. During this entire period, he has also been a Professor in the Anthropology Department. His research interests have centered in the Plains, the Southwest, and Great Basin with special concern for the interactions of cultures between these areas during the past thousand years. Although from time to time he has done research on other problems, he has continued to return to the archeology and ethnohistory of the Apaches of the plains, a research interest which he shares with his wife, Dr. Dolores A. Gunnerson. His research has resulted in numerous professional publications in journals and monograph series.

